Vol. XXIX FEBRUARY 1935 Number 2

EXCAVATING ENGINEER

FOUNDED 1905

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Page 73 starts the story of Peter Mitchell, Inc. work on this 3½ mile section of the new Merritt Parkway, 4-lane super-highway from Bridgeport, Conn., to the New York state line.

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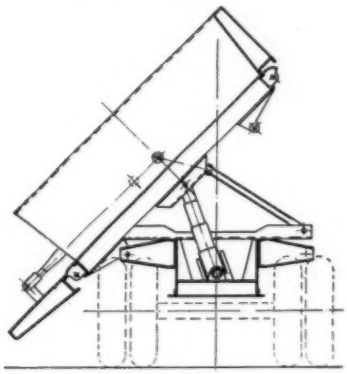

Section through center showing dumping mechanism.

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EXCAVATING ENGINEER

DEVOTED EXCLUSIVELY TO EXCAVATION

About Excavating Projects — By Excavating Men — For Excavating Men — The World Over

Vol. 29 FEBRUARY, 1935 No. 2

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These interesting articles will appear in early issues of Excavating Engineer. Watch for them!

Building San Gabriel Dam No. 1.

The construction of this huge rock fill dam presents many interesting features. West Slope Construction Company is the contractor on this $8,000,000 project.

New Type Breakwater Lowers Construction Costs

Rohl-Connoly Company are building a breakwater in Los Angeles harbor with a clay and sand core. This type of construction effects a saving of 50% over estimated cost based on using all rock.

Published Monthly by **THE EXCAVATING ENGINEER PUBLISHING COMPANY, South Milwaukee, Wisconsin, U.S.A.**

F. O. WYSE
Managing Editor

ARNOLD ANDREWS
Editor

Regular subscription: 25 cents per copy, $1.00 a year; Canada and foreign, $2.00 per year. Special subscription: Upon application on card inserted in this number, this publication will be sent frequently (not regularly) free of charge, to companies, executives and supervisors engaged actively in the industry of excavation.

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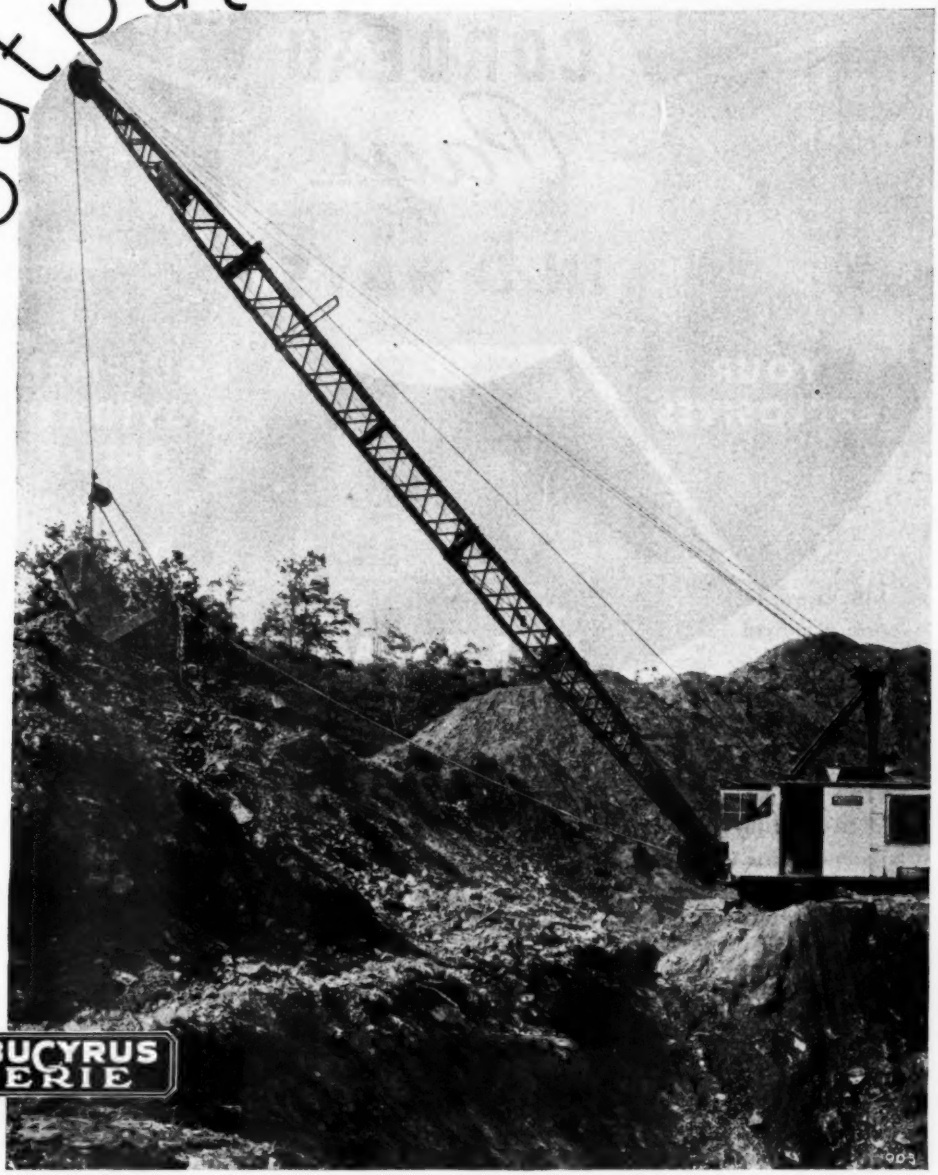
output



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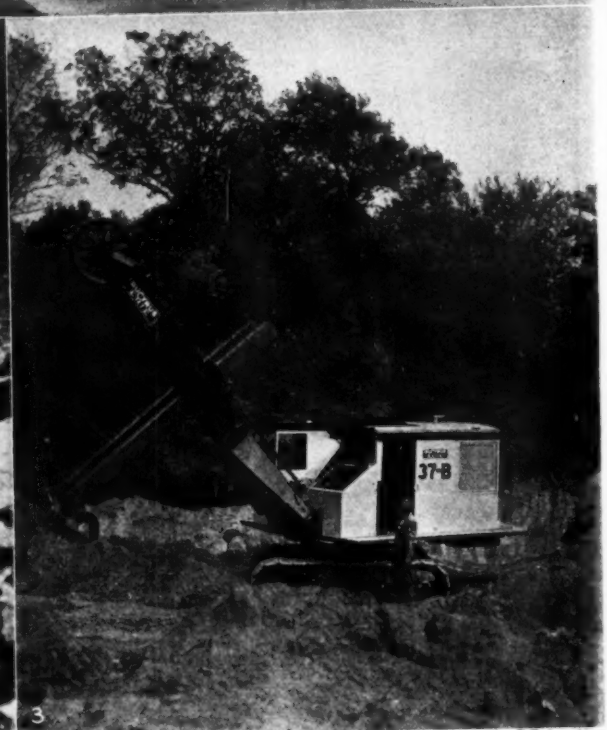

37-B

EXCAVATING ENGINEER
FOUNDED 1905

FEBRUARY 1935
VOL. XXIX NO. 2

●*This six-yard Linn tractor dump wagon has a down-folding tail gate which makes dumping easy.*

Merritt Parkway Construction Embodies Unusual Features

Peter Mitchell, Inc. of Greenwich builds 3½-mile section of Parkway through virgin forests on Connecticut's largest highway excavating project

By SPENCER A. JONES

AFTER YEARS of agitation, centered for some time about the choice of routes through Fairfield County, Connecticut's great Merritt Parkway is now well under construction.

This four-lane thirty-five-mile long passenger highway, estimated to cost nearly $25,000,000 has been started at the New York state line and will have its eastern terminus at or near Bridgeport, Connecticut.

The Westchester County (New York) Park Commission plans to spend $1,250,000 to extend the Hutchinson River Parkway three and one-half miles eastward to connect with the Merritt Parkway at the state line.

"Standing upon the ground where, on a hot Saturday afternoon in the latter part of last June, First Selectman Oscar D. Tuthill, of Greenwich, turned over the first spadeful of soil, the reporter was able to envision the completed Merritt Parkway — a spacious boulevard passing through a picturesque, rolling countryside — fulfilling the dreams of Congressman Schuyler Merritt for whom the highway was named.

"A wide avenue of fill and grading stretched out to the northeast between a vista of beautiful fields and wooded hills on either side. Stakes were laid out for two lanes of highway, separated by a fifteen-foot strip to be landscaped." (Greenwich, (Conn.) Daily News-Graphic.)

A three and one-half mile section extending northeast from the state line, and now more than 60% completed, is being built by Peter Mitchell, Inc., Greenwich, Connecticut, and includes several outstanding items. First, it is believed that this is the largest earth and rock excavating job ever undertaken in the state of Connecticut; second, the fuel for all equipment, except one electric concrete tamper, is either fuel oil or gasoline (something of an innovation for New England where

Frontispiece

●*1. Hutchinson River Parkway at Saxon Woods . . . Eventually this beautiful drive in Westchester County, New York, will connect with the Merritt Parkway now being built by the Connecticut State Highway Department. 2. A Bucyrus-Erie 1½-yard shovel loads a Mack truck in a heavy rock cut . . . over 220,000 yards of rock have to be removed on this job. 3. Another of the 37-Bs has easy going on the dirt work. 4. A new bridge built by the Lee Construction Company of Boston carries the Parkway over Riversville Road and Byram River.*

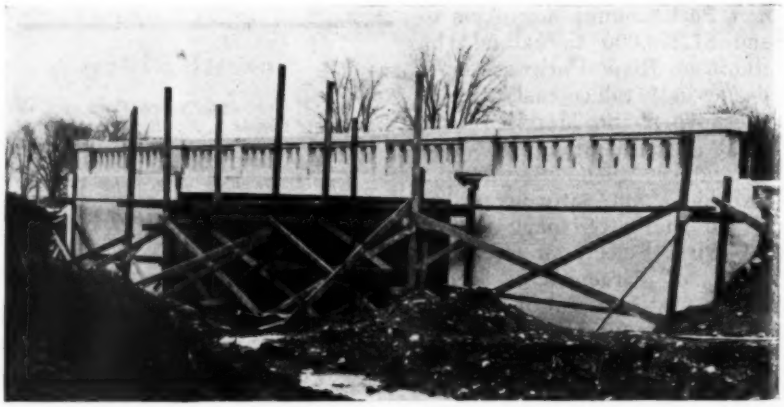
steam power is still widely used for excavating equipment); third, nearly all labor is recruited from Fairfield County, Connecticut, and furnished to the contractor by the United States Employment Bureau; fourth, the loam topsoil is handled and stored as carefully as if it were the ore of some precious metal; fifth, the right-of-way runs through what is practically virgin forest and had to be logged off—this within twenty-five miles of New York City; sixth, there have been no serious accidents or personal injuries on the job; and seventh, the weather has been uniformly favorable.

220,000 Yards of Rock to be Moved

The contract, awarded to Peter Mitchell, Inc., in the original amount of $583,080 and later revised so that it now totals more than $600,000, calls for about 220,000 yards of rock and 110,000 yards of earth excavation; nearly 10,000 yards of trench excavation; approximately 22,000 yards of stone fill, and 22,000 yards of gravel fill. Three concrete bridges and a 10x10 concrete box culvert approximately 350 feet long are included in the contract and the contractor is proceeding, under an additional $100,000 contract, with the erection of a concrete bridge where the parkway crosses Round Hill road, including the construction of a new length of Round Hill road seventy-five feet northeast of its present location. A separate contract, now practically completed, was awarded by the state to Lee Construction Company, Boston, Massachusetts, for the erection of a concrete and steel bridge over the Riversville

● *General view of Merritt Parkway construction looking northeast. Note crushed stone filling of rubble-walled trench along toe of cut in left foreground. Perforated pipe is buried under this crushed rock at bottom of trench to carry sub-soil water from road.*

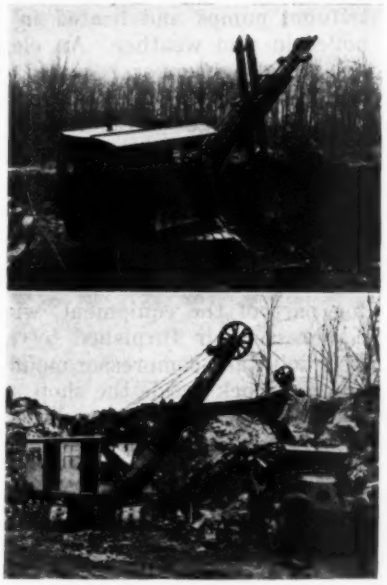
● *The new Parkway cuts through hills and forests. Mack trucks haul the dirt and rock from the Bucyrus-Erie shovel to the fill. An Ingersoll-Rand compressor in the left foreground supplies air for the Worthington Rockmaster drill in the center and the Ingersoll-Rand wagon drill at the right.*



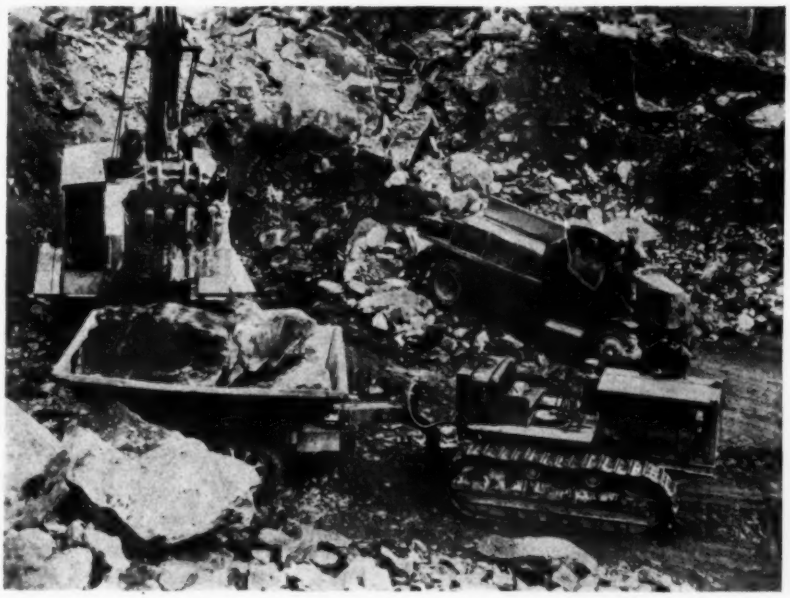
● *One of the reinforced concrete bridges carrying the new Merritt Parkway over a small stream. Note excellent finish of cement work.*

road and the Byram river, where the road and river run in adjacent parallel curves beneath the new parkway. No contracts have, as yet, been awarded for paving, curbs or gutters.

Two Ingersoll-Rand wagon drills and two Worthington wagon drills are used for the 1½-inch blast holes in rock excavation, with the compressed air furnished by eight Ingersoll-Rand four-wheel compressors and one Chicago Pneumatic Tool compressor mounted on a truck. Nine Ingersoll-Rand jackhammers are used for drilling 1½-inch holes for blocking and other small shots. Night time drilling was attempted for a while in order to speed the work, but had to be discontinued owing to the protests of residents living nearby.



● *Top: A P&H shovel removes the overburden on top of a rock cut. Below: After drilling and blasting the rock is loaded out with a Bucyrus-Erie 1½-yard shovel and 5-yard Mack trucks.*



● *Looking down into a rock cut on Merritt Parkway. A Caterpillar Diesel 50 pulls the 10-yard La Plant-Choate dump wagon which has been loaded with oversize by the Bucyrus-Erie 37-B. The Mack truck in background waits for a load of smaller material. Note size of rocks which are laid aside by the shovel operator to be loaded into the big La Plant-Choate wagon.*

● *Inspector W. Townsend oversees the construction of a 10x10 concrete box culvert approximately 350 feet long. The large white sheets of cloth on the side hill in the background are placed over the concrete to keep it moist.*

Trees Are Protected Against Injury from Blasting

Three-quarters of a pound of Hercules Gelamite, 1½x8 No. 1, per yard of rock, touched off by fifty-hole batteries and Hercules Type 6 electric blasting caps with twenty feet of enameled copper wire, shatter the rock to removable sizes. The largest blast used sixty cases of dynamite and brought down more than 4,000 yards of rock. This is one of those jobs where the powder men have to be very particular about blasting so as not to damage any trees. A special inspector from the State Highway's landscape department is on hand all the time to see that trees are not endangered by flying rocks and to see that, if any trees should be hit, they are repaired immediately. To date, the greatest damage done by any blast was $1.50 worth to the roof of a house where a small rock fell while blasting was going on immediately adjacent. Three 1½-yard 37-B Bucyrus-Erie shovels, two Byers-Masters 1-yard shovels, two 1½-yard Northwest shovels and one P. & H. shovel, all gasoline-powered, do all the earth and rock excava-

• *No discomfort here . . . the operator sits comfortably in an upholstered seat.*

• *An Ingersoll-Rand wagon drill puts in an inch and a half blast hole in short order. In the background the new right-of-way runs to the northeast.*

tion. The rock, nearly all granite, is, as might be expected, both hard and heavy. Students of geology have been busy throughout the progress of the job collecting the many fine specimens of quartz crystals, garnets, and other semi-precious stones brought to light during the progress of digging the cuts.

Earth and rock are loaded by the shovels to a fleet of 3 and 5-yard dump trucks, two 10-yard La Plant-Choate two-way dump wagons, pulled by Caterpillar Diesels, and one 6-yard Linn tractor dump wagon.

Rough grading of fills is done by four Caterpillar Diesel 35's, two Cletrac 20's and by the previously mentioned Caterpillar Diesels (a 50 and a 75) when these last two tractors are not too busy pulling around the La Plant-Choate dump wagons. All Caterpillar Diesels used for grading are equipped with La Plant-Choate Hydraulic Roadbuilders.

Bridges included in the Mitchell contract were constructed under the supervision of P. Deluca, Superintendent of Bridge Construction for the contractor. Lehigh Portland cement and Truscon steel were used in the reinforced concrete, which was mixed in a 1-yard Ransome mixer, using water pumped from springs or streams by gasoline-driven centrifugal pumps and heated in a boiler in cold weather. An electric vibrating tamper, required on all Connecticut State Highway concrete bridge work, removed the voids in the concrete.

Equipment is repaired and drills sharpened in a completely equipped blacksmith shop, an Ingersoll-Rand drill heater and an Ingersoll-Rand drill sharpener being part of the equipment, with compressed air furnished by an Ingersoll-Rand compressor mounted on a truck beside the shop.

(Continued on Page 102)

• *The 1½-yard shovel drops a dipperful of rock into the six-yard Linn dump wagon. Note the special seat arranged so that the driver can back the wagon quickly and easily under the shovel or out on the dump.*

● ***J. A. Howland & Sons, Inc. of Sea Bright, New Jersey, employ novel method to save town of Ocean City, Md., from being washed away by ocean waves.***

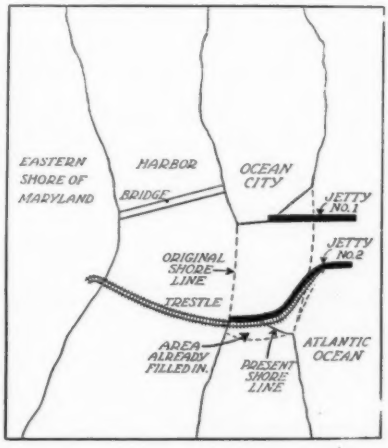
By **D. W. EVANS**

Jetty Builders Save Town

WHEN THE mighty ocean sweeps in and, of its own free will, excavates a navigable channel urgently desired by the town residents, that's news. And that was what happened at Ocean City, Md. The only trouble is the ocean didn't stop work after it cut through the harbor opening. The roaring waves kept right on excavating, enlarging the passage-way until it began to look as though the harbor, no longer closed against the sea, would soon be so exposed as to be no harbor at all.

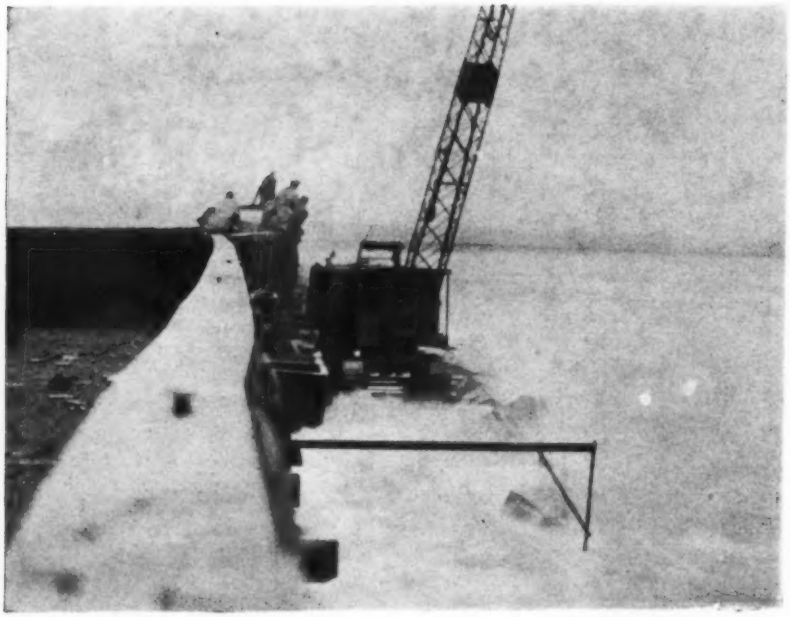
Ocean City, Maryland, is located almost midway of a bar of sand running for seventy miles along the Maryland and Delaware coast—the "Eastern Shore" as it is called. The bar itself ranges in width from a few hundred feet to more than a mile. Within the bar is navigable water. For years the inhabitants of Ocean City have wanted an outlet to the sea closer than the nearest existing channel, 35 miles away. Fishermen and conductors of fishing parties would unquestionably be benefited. Dredging a channel through a few hundred feet of sand bar would be very much worth while. But no money was available to pay for the dredging.

● *A view of the completed portion of the jetty showing the close fitting 6 to 12-ton cap stones placed by the Gas+Air crane. At the far end of the trestle the Kochring crane places the core stone.*



Then a storm came up, wind and waves piled up the water inside the bar until it was several feet higher than that outside. Seepage started almost at the center of Ocean City. The channel through the sand widened as the water within the bar washed everything before it as it poured out to sea. A railroad, two high-

● *The location of the two jetties is shown here. When finished Ocean City will have a fine harbor and channel well protected against further damage by ocean storms.*



● *Even though the waves wash up over the jetty, the work goes forward. The vertical stick marks the center line of the jetty.*

ways, dozens of houses, slid away. Still after the storm, there was the channel they wanted. But the waves continued the work started by the storm. The gap widened to 1,100 feet. The whole town was gradually being washed into the sea. Soon the harbor would have no protection at all. The situation in which the residents found themselves was a dangerous one. Steps had to be taken immediately to relieve conditions. As a result of a study it was decided a breakwater or sea wall on each side of the channel would stop any further erosion and protect the harbor channel. The project was worked out and presented to PWA with a request for money to finance the work. PWA approved the project and arranged to provide the necessary funds.

● *The town of Ocean City, Maryland. In the foreground may be seen the completed first jetty which has saved the town from disastrous sand erosion.*

Contract Awarded to J. A. Howland & Sons, Inc.

The Government, through the PWA, awarded the first contract to J. A. Howland & Sons, Inc. of Sea Bright, N. J. for the construction of 1,350 feet of jetty on the north or town side of the channel for $250,000. Later this concern was awarded a second contract amounting to $180,000 for a jetty 2,500 feet long on the south side of the channel. These jetties, on either side of the channel cut through by the ocean storm, will give Ocean City a fine harbor entrance and protect the town against any further damage. The contractor has already completed one, and is well along toward finishing the second. The methods used in placing cranes for handling the stone are interesting. Construction of the trestles by which the stone is brought to the cranes for placement required methods novel to contractors less familiar with the whims of the mighty Atlantic. Especially interesting is the use, for the first time on such work, of a unique Rock Grab for quicker handling of the stone used both at the quarry and at the jetty itself.

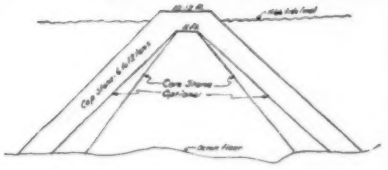
Mr. Howland an Authority on Jetty Construction

Jesse A. Howland has been building jetties and piers and other structures defying the ocean's might for the past 35 years. He is president of the firm of J. A. Howland & Sons, Inc. His four sons, James E., Addison J., George W., and Hartson J. Howland are all actively engaged with him. Another important member of the firm is "Doc" Lindsey, who handles engineering features and financial matters.

Jesse Howland has built jetties all up and down the New Jersey Coast. He was sent to Europe by the State of New Jersey to study methods in use there. He was originator of the now widely accepted practice of building jetties to trap the sand washed along by the waves, thus building or enlarging beaches or, as on the present job, to stop disastrous sand erosion by the action of the waves.

Jetty Specifications Detailed

The two Ocean City jetties are constructed of granite, ranging in size from hand stone to huge slabs weighing 12 tons and over.



● *Cross-section of rock jetty built by J. A. Howland & Sons, Inc., at Ocean City, Md.*

The general design calls for a 1 to 1 slope on the sides and a flat top 10 to 12 feet wide. The width on the bottom depends on the depth of water. The jetties are to be finished 2 feet above high water. Detailed specifications call

for a 4-foot layer of small stone across the entire width of bottom, then a core of small stone sloped to a 4-foot top and with sides 4 to 8 feet inside of the finished profile. To hold this core in place a layer of mixed small and large stone is laid along both slopes. Finally the outer wall of 6 to 12-ton cap stone is laid along both sides and the top to form the fairly regular profile of the finished jetty. Past experience with jetties which must stay put in spite of ocean storms, and waves and currents, shows that the vital factor is to have enough weight of stone, all keyed together to form a unit.

● *The tips of the Rock Grab jaws have a special, hard steel face to resist abrasion.*

Weight Vital to Combat Ocean Force

Jim Howland tells of an experience at Monasquan with a 10-ton slab of granite. Placed by the crane, the block of stone was released just before a wave crashed into it. When the spray subsided, the huge mass had been completely up-ended. It is hard for those unfamiliar with the ocean to realize the power of thundering tons of water. A line of extra-strength steel sheet piling on this same job was torn like a sheet of paper by the fury of the waves. So these jetties at Ocean City, running 120,000 pounds of stone per lineal foot, are no more than enough to safely withstand the battering of years.

● *The telephone poles mark the line of the railroad washed away by the storm. The sand bar originally filled all the space now covered by the water in the foreground.*

● *Transferring stone at the railroad siding . . . this Bucyrus-Erie steam crane equipped with a Rock Grab makes a speedy, efficient tool for moving these huge stones from the International truck to the waiting line of gondolas.*

Use Rock Grabs at Quarry

Stone for both jetties has been shipped in by rail from Port Deposit, Maryland. The successful bidder on the first contract was York Valley Lime and Stone Company. Stone on the second contract was contracted from the Port Deposit Quarry Company. The stone shipped ranges, of course, from one-man stone to 12-ton chunks. The use of the Bucyrus-Erie Rock Grab for handling this stone has proved both speedy and economical at the quarry and also at the jetty itself.

Rock Grab a Time Saver, Also Safer

The Rock Grab, as is shown in the accompanying illustrations, opens and closes on much the same principal as a clamshell bucket. Its power to hold a stone of any size increases as the weight of the stone increases. This piece of equipment replaces the chain usually employed for handling stone. It is far safer, as danger of the stone slipping is greatly reduced. Also, it is much quicker in operation, both for picking up the stone and for releasing it.

At the York Valley quarry, a stiffleg derrick loaded the large stones on 10-ton International trucks which transported them to the railroad siding where a Bucyrus-Erie Type-B crane, equipped with a 5-ton Rock Grab, loaded them into gondolas for shipment to Ocean City. It is estimated that the time saved in this transfer was just about 50% of that which would have been required if chains had been used for lifting the stone.

Arriving at Ocean City, the cars of stone, each holding 50-tons, are hauled by a 15-ton Plymouth gasoline locomotive over

● *Under perfect control by the operator, the Rock Grab is fast in picking up a stone and even faster in releasing it.*

the mile-long trestle to where the cranes are ready to unload and place the stone in the jetty. The smaller rock is dumped from skips (holding 3 or 4 tons each) to form the core. The larger cap stone is carefully placed piece by piece to conform exactly to the specified jetty outline.

Two gasoline-powered crawler-mounted cranes are used for placing the stone. One, an 8-ton Koehring crane, is mounted on a flat car and operates from the trestle, placing the core stone and rough slope stone at the outer end of the jetty. The second machine, a Bucyrus-Erie Type GA-2 Gas+Air crane, operates from the top of the jetty itself, placing the 5 to 12-ton rocks for the finished slope and top of the jetty.

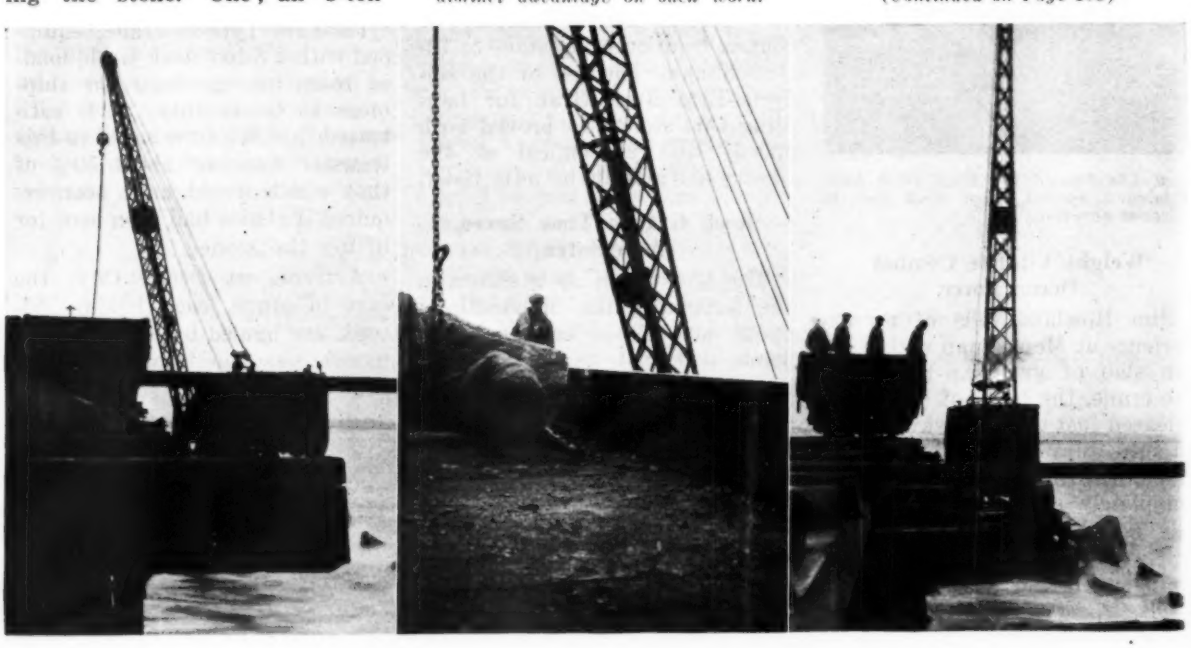
There is a constant element of danger in jetty construction, due not only to the ocean waves, but also the handling of loads at or near the capacity of these cranes. The rock must be placed exactly in position, and especially on placements near the toe of the jetty the machines are critically close to the tipping point. A steam locomotive crane on the job was tipped over, falling off the trestle into the ocean. Fortunately nobody was injured, but the expense of salvaging the machine will be heavy. Following this accident the Bucyrus-Erie crane was mounted on a barge and floated over to the jetty, where it was unloaded and has since continued to work, covered with salt spray by every breaking wave.

● *The 15-ton Plymouth gasoline locomotive spots a car for the Gas+Air crane.*

Jetting Method Used for Pile Driving

A major feature of the placing of the second jetty was the building of the mile-long trestle from which the work is carried on. Pile bent construction was employed with 12″x12″ timbers to carry the ties for the standard gauge rail-

(*Continued on Page 108*)



● *Left: The Gas+Air crane swings around to get another capstone. Center: The old chain method requires time for blocking, fastening and adjusting the stone. A 12-ton stone is being hoisted by the Bucyrus-Erie crane from the gondola. Right: Operator Theodore Maxon places another block in the crest of the jetty. The air swing on the crane is a distinct advantage on such work.*

Additional Highway Forecast

We present here additional highway information received from several states supplementing the very complete forecast which appeared in the January issue of Excavating Engineer.

California

The highway budget just recently approved calls for an expenditure of $61,285,000 during the biennium July 1, 1935 to June 30, 1937. Of this amount $37,807,000 will be spent on new construction with $26,498,980 already allotted to 181 projects. The construction fund will be divided so that northern California receives $19,735,254 and southern California receives $18,071,746 in accordance with the terms of the Breed Bill.

The entire highway fund will be disbursed as follows:

New Construction	$37,807,000
Maintenance	15,215,500
Administration and Engineering	2,450,000
Allocation to cities (¼c)	5,812,500
Total	$61,285,000

Revenue will be derived as follows:

Gas tax (State's portion 2c)	$46,500,000
Motor Vehicle Fees	5,300,000
Federal Aid	9,485,000
Total	$61,285,000

The largest project of the 181 already approved covers the construction of the approaches to the San Francisco-Oakland Bay Bridge at an estimated cost of $3,300,000. A complete list of the approved projects was published in the January 1935 issue of **Western Construction News**

Colorado

Information received from the office of Chas. D. Vail, State Highway Engineer, stated that highway construction in 1934 resulted in a greater mileage of improvement on Colorado highways than in any previous year.

Federal Aid projects, constructed in 1934 by the State Highway Department in cooperation with the U. S. Bureau of Public Roads are summarized as follows:

Graded Projects	18 miles
Gravel or Crushed Rock Surfacing	321 miles
Oil Processed Surfacing	2 miles
Bituminous Pavement	15 miles
Concrete Pavement	20 miles
Total	376 miles

In addition, the State Highway Department constructed 505 miles of oil processed projects and 10 miles of grading and surfacing, bringing the total construction for the year to 891 miles.

Railroad grade crossing elimination work is now being emphasized in highway programs throughout the country. Colorado has a large number of grade crossings which will be eliminated as rapidly as funds are made available for this work. This phase of highway construction has gone forward steadily for several years, and on the Federal Aid system of highways alone the following railroad crossing hazards have been eliminated.

Railroad Grade Crossing Elimination by Overpasses	22
Railroad Grade Crossing Elimination by Underpasses	20
Railroad Grade Crossing Elimination by Relocating Highway	66
Total Railroad Grade Crossing Eliminations	108

The status of improvement on Colorado's Federal Aid System is as follows:

Mileage to Federal standards:

Graded	36 miles	
Surfaced	676 miles	
Oil Processed Surfacing	976 miles	
Cement Concrete Pavement	532 miles	
Rock Asphalt Pavement	6 miles	
Bituminous Macadam	4 miles	
Bituminous Concrete Pavement	62 miles	
Brick Pavement	1 mile	2,293 miles

Mileage not to Federal standards:

Graded	636 miles	
Surfaced	583 miles	
Oil Processed Surfacing	26 miles	1,245 miles
Total Mileage on Federal system		3,538 miles

This mileage comprises approximately one-third of the total state highways in Colorado and includes the most heavily traveled portions of the system.

In accordance with the provisions of Federal legislation, a portion of Federal Aid funds is being used for roadside beautification. Two of these projects are now under way, one along the southerly edge of Fitzsimons Hospital, east of Denver, and one south of Littleton on the Colorado Springs-Denver Highway. The work involves planting groups of trees, shrubs and flowers; also shoulders of pavement are widened and slopes are flattened.

The Budget for 1935 will be about as follows:

Receipts:

Federal Aid	$2,300,000
Gasoline Tax	3,700,000
All other sources	970,000
	$6,970,000

Probable Expenditure:

Federal Aid Projects	$4,600,000
State Oiling Projects	500,000
Maintenance & Equipment	1,500,000
Administration, Surveys, Traffic Signs, Census, Compensation Insurance and Miscellaneous	370,000
	$6,970,000

The funds mentioned above as allotted for Federal Aid Projects are fairly well distributed over the state, but for the most part are confined to

● *On a road widening job in the Rockies, Poston Brothers of Kalispell, Montana, made good progress with their Bucyrus-Erie 10-B shovel loading to Ford trucks.*

● *Here is a section of the $3,680,000 Broadway low-level tunnel project, near Oakland, California, where a new traffic link between Alameda and Contra Costa Counties is being constructed by Six Companies, Inc. The most difficult engineering feat of the gigantic project is the construction of two huge one-way tunnels, each 3,168 feet long 25 feet wide and 3½ feet high. Whitcomb locomotive, Lorain shovel, and a fleet of Ford V-8 trucks play important parts in the success of the undertaking.*

continuing work and completing gaps on the primary roads.

A few of the more important allocations are as follows:

Road No. 1, Widening pavement north and south of Denver--$300,000

Road No. 2, Improvements between Denver and Idaho Springs, including widening of pavement adjoining Denver on the west---------- 200,000
Closing gap in Grand County and continuing work westerly in Moffat County ---------- 450,000

Road No. 4, Improvements between Colorado Springs and Limon 230,000
In Lake and Eagle Counties -------- 440,000

Road No. 6, Gunnison, Delta and Mesa Counties 430,000

RoadNo. 8, Southeast of Limon 250,000

Road No. 10, Closing gaps between Walsenburg and west State line 460,000

Road No. 12, Between Las Animas and La Junta 255,000

Road No. 16, Big Thompson Canon ---------- 258,000

Road No. 81, Closing gaps between Wiggins and Denver ---------- 540,000

Additional
Road No. 6, In Prowers County 155,000
Arkansas Valley in Fremont County-- 355,000

The above Federal Aid program is predicated upon being able to meet the full amount of Federal Aid which has been allocated to Colorado. This will require an additional $800,000 over what is at present in sight, but it is anticipated that the General Assembly will provide this money in order to secure the entire Federal allotment.

The state oiling work will be continued along the same line as last year on the principal roads.

The items for maintenance and equipment, as well as administration, etc., are the standard fixed charges for the Department.

Nevada

According to information received from S. C. Durkee, State Highway Engineer, Nevada has set up a tentative construction and maintenance budget for the 1935 calendar year calling for the expenditure of $4,406,600. The program was approved by the Board of Directors January 12, 1935.

The following is a list of individual projects involving an expenditure of $100,000 or more taken from the budget:

County	Work	Length miles	Amt.
Churchill,	gravel surface	16.60	$100,000
Clark,	asphalt surface	16.27	220,000
Elko,	oil treatment	67.96	140,000
Elko,	gravel surface	15.00	120,000
Elko,	gravel surface	15.00	150,000
Humboldt,	bridge and approaches		125,000
Lincoln,	gravel surface	14.00	145,000
Lyon,	asphalt surface	11.11	165,000
Mineral,	gravel surface	21.88	220,000
Nye,	gravel surface	27.00	190,000
Washoe,	concrete	3.67	142,000
Washoe,	concrete	4.22	150,000
Washoe,	gravel surface	23.00	100,000
White Pine,	oil gravel surface	20.08	160,000

A summary of the entire program follows:

	Miles	
New Construction	137.11	$1,099,000
Reconstruction—Gravel	82.92	520,000
Reconstruction—Oil Treated Gravel	80.53	573,000
Reconstruction—Plantmix Asphaltic Surface	27.38	385,000
Reconstruction—Cement or Asphalt Concrete Surface	9.45	342,000
Bituminous Treated Surface	239.10	601,000
Roadside Beautification	44.00	21,000
Footpath Construction	2.00	2,000
Construction Grade Crossing Signals		3,000
Bridges		210,000
Construction Program		$3,756,600
General Maintenance		555,467
Specific Maintenance		63,033
Maintenance Administration		31,500
Total Budget		$4,406,600

Wyoming

The ninth biennial report of the Wyoming State Highway Commission contains the following interesting facts:

Total expenditures for the biennial period (October 1, 1932 to September 30, 1934) amounted to $10,495,420; construction costs for this period amounted to $7,964,420; while maintenance costs were $1,347,518.

The construction program involved 383 miles of grading and draining; 342 miles of base course surfacing; and 632 miles of oiling. The program required approximately two million tons of crushed rock material, thirty thousand tons of concrete aggregate, and fifteen million gallons of bituminous oil. During the seasonable working weather throughout the biennium, the highway program has provided work for twenty-five per cent of the registered unemployed men in Wyoming.

Over a period of years, the average cost of a composite mile of highway completed to oiled surface standard has been $12,900. To date sixty percent of the State Highway System is oiled. The remainder is in various stages of improvement, with the exception of 312 miles unimproved. It will require at least sixteen million dollars to bring the total Federal Aid system up to present day oiled standards.

FIELD NOTES

Keeping the Oil Can Clean

BITS OF WASTE or cloth are commonly tied near the end of long, oil-can spouts to keep the oil from running down when the can is returned, after oiling, to a vertical position. This is particularly useful when the can contains light oil. A neat, practical device for this purpose is a rubber connection shield

used on automobile distributors. It can be fitted on the spout in about any position desired. The inside of the shield is filled with a bit of clean waste. This stops effectively any oil running down the spout. — *Frank W. Bentley, Jr.*

Doubling the Life of a Conveyor Belt

MOST OF THE wear on a conveyor belt usually occurs during the process of loading. When the material is loaded on one side that is where the belt wears, as shown in the accompanying sketch. To double the

life of the belt simply turn it through 180 degrees, that is, "end for end". The material being loaded will then strike and wear the unworn or "good" side and the belt need not be discarded until that side is worn out.

Bearing the above in mind it is obvious that there is an advantage in not loading a belt in its center because turning such a belt through 180 degrees will do no good. A center-loaded belt will last only about one-half as long as a belt that is first loaded on one side and then on the other.

—*W. F. Schaphorst, M.E.*

Excavating Contractor Loses Damage Suit

FOUR connected buildings collapsed in Montgomery, Alabama, while adjacent lots were being excavated for the construction of a building. The owners of the injured buildings sued both excavating contractor and owner by whom he was employed for damages.

The United States District Court for the Middle District of Alabama allowed judgment in favor of the plaintiffs against both defendants. But, in an opinion lately rendered, the United States Circuit Court of Appeals for the Fifth Circuit—a tribunal ranking second only to the highest court of the land—set aside the judgment as to the owner. Liability of the contractor was confirmed.

In both courts, it was conceded that no liability could be imposed on either defendant, so far as the excavation was confined to defendant owner's premises, even though no notice was given to the plaintiffs that such work was intended to be done.

Plaintiffs' claims were predicated upon a theory that their buildings collapsed because the contractor negligently excavated upon their property and did not sufficiently support the wall of an adjacent building after excavating under it.

Upholding judgment in favor of plaintiffs, as to the contractor, the Circuit Court of Appeals said (S. H. Kress Co. v. Bullock Shoe Co., 56 Fed. 2d, 713):

"Defendants concede that if defendants committed a trespass upon plaintiffs' property as the result of which their buildings fell, they would be liable. They certainly cannot complain because the court further conditioned plaintiffs' right to recover by requiring that the jury find, not merely that the defendants made an encroachment and committed a trespass, but also that they acted negligently while doing so. . . .

"Nor may defendants assert that because" two of the plaintiffs "were protected by a lease which gave them continuing rent without the necessity of rebuilding, defendants may, under cover of that covenant, destroy plaintiffs' buildings without accountability. The fact that plaintiff has indemnity, no matter of what kind, may not be availed of in defense by a wrongdoer."

The court's reasoning as to why the defendant owner was not liable is as follows: "When the thing done by an independent contractor which caused damage is, as here, outside of and beyond the scope of the contract, collateral and contrary to it, the owner may not be held liable for the consequences of that act, for the contractor is not as to that act his agent, either by selection or by law. The law of Alabama does not charge an adjoining owner with an affirmative duty to share or support his neighbor's buildings. The common law does not do so. The pleading and the evidence in this case establish that whatever wrongful act was done to the injury of plaintiffs was done, not pursuant to the contract, but in carrying out an effort wholly collateral to it, and beyond its scope. . . . The acts thus done were not the acts of Kress at all, but the acts alone of Miller, the contractor, for the doing of which the owner would not be liable."

—*Arthur L. H. Street, Attorney at Law.*

A complete report of the annual conventions held in January by the American Road Builders' Association; the National Sand and Gravel Association; the National Crushed Stone Association; and the National Slag Association will appear in the March issue.

Beg Your Pardon

IN NOVEMBER, the article "Making Use of Water Flow Measuring Method" by W. F. Schaphorst described the use of a formula devised by the writer. Through a typographical error, a square root sign was omitted from the formula.

The correct formula is:

$$5.65\ d^2\sqrt{H}=G$$

EXCAVATING ENGINEER
FOUNDED 1905

A Monthly Publication Devoted to Excavating and Allied Subjects

The Excavating Engineer Publishing Co.
South Milwaukee, Wisconsin

F. O. WYSE
Managing Editor

ARNOLD ANDREWS
Editor

E. M. HEUSTON
Advertising Manager

E. T. OBENCHAIN
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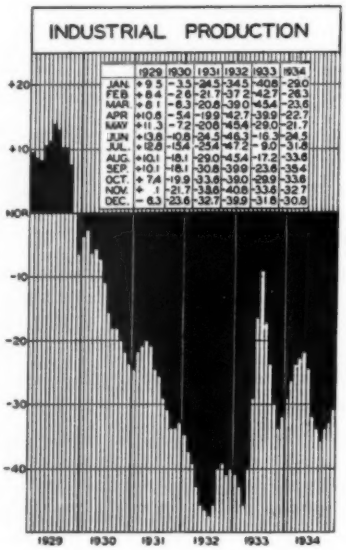
The Business Situation

THE CURVE for industrial production now shows an upturn which started in October, 1934 and has continued for four months. From the industrial production chart in the next column, reprinted by courtesy of the Cleveland Trust Company, it will be noted that this is the sixth rise since the great depression started about the middle of the year 1929. It will also be noticed that since the low point was reached in July of 1932, four successive attempts at recovery have been made by business in the United States and that each one of them so far has been a little longer sustained than the previous one.

As we have said before in these pages, we apparently have reached a point where release of private funds (as opposed to Federal funds) into investment channels is absolutely necessary before lasting improvement can become a reality. Every hindrance to this investment should be removed. Every form of legislation which tends to restrict the investment of funds by individuals and the use of those funds by industry should be altered.

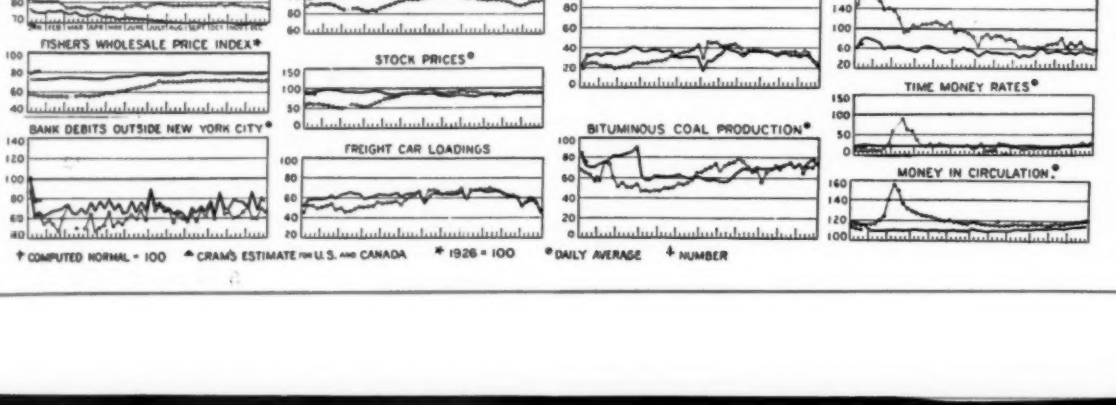


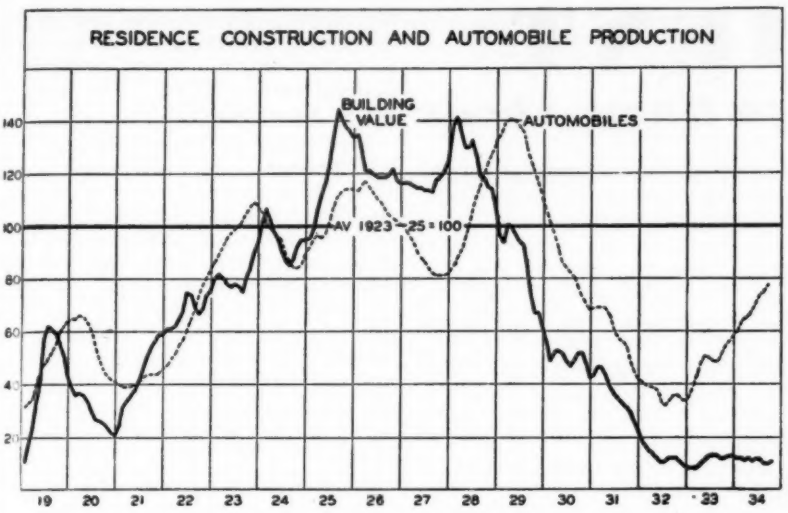
In 1921 perhaps the two most important factors in our recovery were the automobile and residence construction. It is highly probable that these two will form the most important elements in our present recovery. The diagram on the adjoining page, reproduced by courtesy of Cleveland Trust Company, shows the volume of production of new passenger automobiles during the past sixteen years compared with the volume of contracts awarded for new residence building.

The enormous increases in new homes and in automobiles in the years immediately following the war were related economic developments. The coming of the automobile made possible the creation of far-flung suburbs around all our cities in localities which could not have been made available for residences with any previous means of transportation. We should have had a building boom anyway because of the restriction of building during the war years, but the automobile greatly increased its intensity and gave it long duration.

Along with these two simultaneous waves of industrial activity we had another related one in the creation of our nation-wide system of new highways, and still another in the immense expansion of the petroleum industry, and its system of gasoline and oil distribution through filling stations. It is clear that we cannot expect any comparably sustained expansion in those lines in the next few years because our national needs have been too nearly satisfied. Nevertheless the diagram indicates that shortages in both automobiles and homes have been developing during the long depression, and that the output of

WEEKLY BUSINESS INDICATORS





automobiles has already regained much of the depression losses.

Probably there is no great need for concern about the part to be played by the automobile industry in 1935. The new models have received the approval of the public, the prices are attractive to buyers, and the volume of orders being received is gratifyingly large. The outlook for residential construction is less bright. For nearly three years now the index line has been fluctuating around the 10 per cent level, and has shown no sustained rising trend. Costs of new construction are too high, and rents of existing homes too low, to tempt many families to undertake new building.

Work Relief for Unemployment

PROPER RELIEF for America's unemployed is a problem which has faced the country with increasing seriousness since 1929, but for which no adequate solution has yet been found. We brief here a suggestion submitted to the Federal Government by R. F. Ward of the Chas. R. Ward Engineering Corp., Brooklyn, New York. This "Proposed Plan for Improved System of Works Relief" is based on an analysis of New York City Relief expenditures. Mr. Ward feels that it would bring greater construction returns for expenditures than have yet been secured, and calls attention to the recognition of the human element which comes with eliminating the dole.

In 1934 the trend was away from work relief, says Mr. Ward, and toward the less desirable home relief; although only 25% of the PWA appropriation had actually been expended up to September 30, 1934. Reports from Washington indicate a desire on the part of the government to assist cities and communities in reviving some sort of CWA. This seems to be the program, but still to be decided is the method by which it is to be carried out.

Because work which results in lasting civic or community improvements is agreed to be the only desirable solution to the emergency problem, work relief allotments are to be increased. Such allotments must, however, be supervised and administered with the utmost efficiency, which can be best obtained through reputable, recognized contractors operating on the following terms:

1. Contractor to supply all executive personnel and general supervision.

2. Contractor to supply plant complete with operators.

3. Contractor to supply material with prices approved and paid by government.

4. Labor to be secured by contractor from designated relief bureau and paid through that bureau.

5. Contractor's remuneration to be on a fixed fee bid to cover executive personnel, plant, and general supervision.

6. Engineering supervision by present organization or modified as may be determined.

7. Financial set up under FERA or as may be later determined.

Operation on this basis, Mr. Ward claims, would increase efficiency through coordinating the securing of materials, equipment, and labor; and, it is estimated, would decrease costs thereof by at least 25%. Such a system would also go far toward restoring the contracting industry, formerly the second largest in the country; toward loosening bank credit and stimulating regular channels of business; as well as toward restoring human values lost in a dole system of Home Relief.

This system is suggested not for regular PWA projects, but for those lasting improvements already prepared and awaiting a restoration of credit. It is felt that this plan, upon its termination, would leave the contracting industry in a position readily and efficiently to continue with work required by public or private agencies.

Another similar step would be to put idle manufacturing plants at work, under the supervision of their owners on a salary and fee basis, producing relief commodities for relief workers until there is a resumption of private demand.

Ancient Ways in Modern Days

FROM SINGAPORE comes this picture of a bullock cart conveying tin ore from mine to mill. The "humped-backed" oxen and native labor are cheap. Time is not a production factor . . . there is always tomorrow.

EQUIPMENT
You Ought to Know About

Automatic Dumping Trailer for Coal Mines

A SEMI-TRAILER which is finding favor in the coal mining industry is the Sanford-Day Automatic Bottom-Dumping unit shown in the accompanying illustration. These trailers are built in 10, 15, 17 and 20-ton capacities, and are also well adapted to sand and gravel plants, crushed stone hauling, etc.

The door operation is entirely automatic. A central dumping

station is necessary, where clearance is provided for the doors to swing down to their wide open position. A simple device is placed at the side of the roadway at the approach to the dumping bin, and the door latch levers are raised when they come into contact with this device. Another device is placed at the exit end of the bin, in the middle of the roadway, and the doors are brought into their closed position by contacting this device as the trailer moves along. It is not necessary to bring the trailers to a full stop in dumping. For further information write the manufacturer, Sanford-Day Iron Works, Inc., Knoxville, Tennessee.

Bucyrus-Erie's 1934 Achievements

IT IS PERHAPS more than ever true in times when business activity is not at its peak that those who stand still are actually sliding back. Only the most active development work can spell progress.

The following new machines announced during the year of 1934 are indicative of the engineering work and development Bucyrus-Erie is constantly carrying on and has carried on with particular activity since 1929:

New ⅜-Yard Excavator. Early in the year announcement was made of a modern ⅜-yard shovel having unusual speed and many new features which have been responsible for its producing a record for low output costs in the field. Like all Bucyrus-Erie contractor shovels, the machine is completely convertible. It is available as shovel, dragline, clamshell, lifting crane, dragshovel, skimmer scoop, backfiller or pile-driver.

New 1¼-Yard Convertible Machine. Another machine announced by this Company during the past year was the 34-B, a yard-and-a-quarter machine of extremely modern design, driven by gasoline, Diesel or electric power and completely convertible to the various forms used by contractors.

Larger Loadmaster Crane. The CT-50, a mobile crane having a lifting capacity of 13,900 pounds at 12-ft. radius, uses a tractor power unit—a Caterpillar 50—has all the mobility of a tractor, may be used to lift and carry loads or used as an ordinary tractor. It swings 240° and carries as standard a 30-ft. boom. It has many industrial uses in addition to its uses of loading logs and sugar cane.

New 14 to 22-Yard Electric Stripper. A machine of unusual size and capacity is the new 950-B. It is capable of producing very high yardages in deep overburden, weighs 2,400,000 pounds, is convertible for use as either shovel or dragline and has many new features to increase its output and lower the cost of operation.

New 8 to 14-Cubic Yard Electric Stripper. The 550-B recently announced is very similar and has all the operating features found on the 950-B described immediately above.

New 120-B Quarry and Mining Shovel-Dragline. This 4-yard machine has all the operating advantages found in the earlier 120-B shovel which has, during the past ten years, established an enviable reputation. It is readily converted in the field for use as either shovel or dragline and is even faster and more powerful than the earlier machine. Its increased speed is such that the shovel cycle is approximately fifteen per cent faster than before.

Two Sizes of Placer Prospecting Drills. In announcing two new placer prospecting drills—the 26P and 33P, Bucyrus-Erie offers to users of such machines, drills which bring to the old time-tried accurate methods of placer prospecting by churn drill, modern speed which may be utilized in lowering the cost of prospecting a territory or making a more accurate estimate of the value by using a greater number of test holes.

Blast-Hole Bit Dresser for 8 to 12-Inch Bits. The No. 12 power-driven bit dresser makes possible remarkable savings in drilling cost. Far more important than the savings in the cost of dressing bits, brought about by this machine, are the much faster drilling and practical elimination of bits stuck in the hole, which follow as a direct result of efficient, uniform and accurately shaped bits produced by the machine.

Chambers Bridge and Bucyrus-Erie Car Transporter. Designed to transport excavated material distances up to eight-hundred feet, these machines work in conjunction with large-capacity excavators of comparatively limited working ranges carrying excavated material to the point of discharge. Each machine is essentially a mobile frame supporting either one or two vertically-adjustable bridges which carry rails for a hopper-bottom car. At one end of the machine is a hopper filled by the excavating machine. The car, filled from this hopper, is drawn to the other end of the bridge and discharged at any given point at the will of the operator, the car making one trip for each cycle of the excavator. These unusual pieces of equipment increase the operating range of the excavating unit and increase output by making it possible for the excavator to spend a greater proportion of its time in digging. They are applicable to levee building, quarry stripping, coal stripping, coal loading, deep-cut excavation and other excavation where comparatively short-distance transportation of large quantities of material is necessary. Each machine is built to

especially suit a particular job, and may be arranged so that the entire unit will swing horizontally on its mobile mounting.

Rock Grab. Several new sizes were introduced in the Rock Grab line and a number of refinements were made on all models. The Rock Grab is specially adapted to handle rock or cut-stone of practically any size or dimensions. The unit is unique in its simplicity, its ability to pick-up rock with a firm, sure grip, and place it just where it is wanted. This device obsoletes the customary dog and chain or sling methods through large savings in handling cost, greater safety and convenience. It is now available in 2½, 5, 10, 15 and 20-ton capacities.

Dragline Buckets. By re-designing its line of dragline buckets, greater strength per pound of weight has been obtained, unusually flexible rope hitches combined with quick-filling and clear-dumping qualities, rigid arch, extensive use of special steels for long wear, have resulted in the Company offering to the field a line of very effective digging tools.

The many developments of the Company, less striking perhaps than those listed above, include:

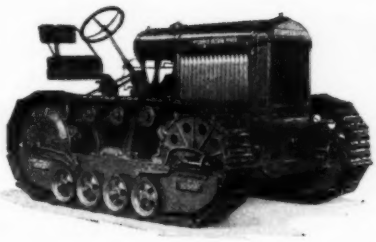
New front-end equipment for shovels ranging from 1¼ to 1¾ yards in capacity, a unique combination of light weight and strength resulting in greater yardage capacity.

A new bowl-door shovel dipper which is lighter in weight, though extremely strong, has specially good dumping characteristics.

Complete information regarding any of the equipment mentioned above may be had by writing the Bucyrus-Erie Company at South Milwaukee, Wisconsin.

Trackson Announces New Tractor

A NEW TRACTOR, known as the Model GI-30, has just recently been put into production by the Trackson Company, Milwaukee, Wis. According to the manufacturer it is specially designed to meet heavy duty requirements. It is the first crawler-tractor equipped with a directional transmission which provides equal agility in either direction of travel — three forward and three reverse speeds. The GI-30 crawler-tractor is of the load carrying type, with large load supporting bearing area, wide tread, low center of gravity and special balance to provide the best stability with front, side and rear end loads. It is rigidly and sturdily constructed, and provides for proper in-building of equipment. The new track has single drive lugs that form a rail upon which the front and rear crawler wheels run. The front wheels are of sheave type, while the rear wheels have drive teeth independent of guide flanges. This design assures positive action, proper alignment under all operating conditions, and provides maximum load-carrying capacity.



The tractor weighs approximately 4 tons, is powered by the I-30 McCormick Deering motor and develops 30 drawbar horsepower. Besides the "directional transmission" it can be equipped with a transmission providing four forward and one reverse speeds.

New Line of A-C Arc-Welding Equipment

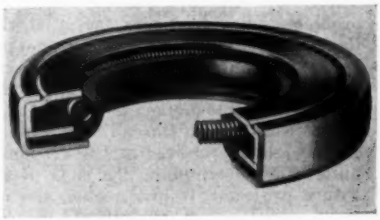
IN ADDITION to its line of direct-current arc-welding equipment, General Electric now has available a complete line of alternating-current arc-welding equipment including transformer units, electrodes, and automatic welding heads and control. The new a-c. equipment is intended for heavy-current welding — primarily for automatic welding because of the heavy currents involved, but otherwise equally well suited to hand applications.

A-C arc-welding is not new, but the remarkable development of arc-welding electrodes during the last few years has only recently made it possible to benefit from the major advantage of the a-c. process — that advantage being the absence of magnetic blow in the arc, and therefore superior quality in the resulting weld. The new transformer units are available in three sizes having one-hour ratings of 500, 750, and 1000 amperes. Primaries are wound for 220, 440, or 550 volts; 60, 50, or 25 cycles; single phase. The transformers themselves are of the high-reactance type, air-cooled and enclosed in a sturdy cylindrical shell. A suitable arrangement is provided to vary reactance so that the full welding range of the equipment can be obtained on any one of three secondary open-circuit voltage settings — the latter being selected by means of taps on the primary winding. The electrode recommended for the a-c. process is the General Electric type W-23, a heavily coated electrode especially suited to a-c welding. The new a-c. equipments are intended primarily for shop use in semi-permanent locations, a lifting eye being provided on top of the transformer unit by means of which the set can be readily moved by a crane.

Complete information regarding the equipment mentioned on this page may be had by writing the manufacturers. We will appreciate your mentioning EXCAVATING ENGINEER.

New Oil and Grease Seal

THE DEVELOPMENT of a new oil and grease seal is announced by National Motor Bearing Company, 1181-78th Avenue, Oakland, Cal. This new seal, known as type BB, is for application to all types of machinery embodying shafts. According to the manufacturer it completely excludes extraneous matter and provides positive imprisonment of oil, grease and fluids. The seal consists of an outer steel case which locks the seal assembly permanently. The outer case has a press-fit accuracy of .002" tolerance, plus or minus on the diameter. An equalizing annular garter spring within the case provides a uniform continuous contact, pressing against the sealing member at all points circumferentially.



SHOTS *from the Firing Line*

Asks $155,000,000 to Aid Waterways

APPROPRIATION of $155,000,000 for rivers and harbors improvements in the coming fiscal year was suggested recently to Secretary Dern by Maj. Gen. E. M. Markham, Chief of Army Engineers.

He said $93,816,610 could usefully be expended on projects authorized by the PWA, $47,164,115 on maintenance and improvement of projects authorized by Congress and $28,906,000 for flood control work. Almost half of the total would be spent on development of inland waterways.

Of this proposed expenditure of $170,000,000 more than $14,000,000 already appropriated remains unexpended, so that roughly $155,000,000 in new funds would be required.

The Mississippi improvement project calls for $35,000,000, to be spent principally on 14 dams and locks.

Committee on Federal Reclamation Policy Submits Report

A REPORT BASED on an impartial survey of Federal reclamation in the west, made by F. E. Schmitt, editor of the "Engineering News-Record," New York, and John W. Haw, director of agricultural development, Northern Pacific Railway, St. Paul, has been submitted to Secretary of the Interior Harold L. Ickes.

On the basis of inspection of typical projects and study of the conditions and problems of reclamation, the committee made the following findings:

1. Reclamation by irrigation of land in the arid and semi-arid western half of the United States is shown by its results to be a sound and desirable national undertaking. It represents a constructive policy of social development.

2. Reclamation should be continued by the Federal Goverment as available means may permit.

3. Except for the influence of the present depressed farming conditions the operating projects are in the main excellently developed and represent strong, prosperous communities.

4. Present reclamation procedure encounters its most troublesome problems in the financial relations between the water user and the Government. The problems arise from the fact that the Reclamation Bureau, though not a banking agency, is required to carry out the banking function of collecting the installment payments on the cost of the works. The Bureau of Reclamation should be relieved of the responsibility for collection in the case of all future projects. If practicable, the revised collection system should be applied also to the operating projects.

5. In the interests of full and efficient utilization of stream waters, the best plan of development as between different regions in the basin and most efficient arrangement of the individual project, it is desirable that the selection and planning of projects be improved by establishing cooperation with states and by authorizing the Bureau of Reclamation to develop its project plans on the basis of best regional results.

6. For permanent security of irrigated agriculture, future reclamation should, if practicable, include measures that will prevent overdevelopment of land beyond the available water supply. Control of storage should remain in the hands of the Federal Government to assure equitable distribution.

7. A uniform policy to govern power developed or to be developed in connection with reclamation projects should be established by law.

The report of the Committee on Federal Reclamation Policy said that without the spread of population through the deserts due to reclamation and the production of wealth which resulted from it, balanced growth of the nation as a whole could not have been achieved. In broadening the base of the country's food supply, in strengthening and supporting its industry, in extending the opportunity for establishing self-supporting homes, in enlarging and building up the nation's transportation system, reclamation has been a fundamental agency of public welfare.

In recommending that Federal reclamation should be continued as available means may permit, the committee pointed out that reclamation now is an important agency in the readjustment of agriculture and the redistribution and settlement of population. In the current season the stream of migration from marginal areas of the Great Plains in search of better and more secure living conditions has made it important that existing irrigated areas be stabilized and rehabilitated, and such additional irrigated areas be developed as may be economically feasible. In connection with this recommendation the committee points out that reclamation agriculture has little relation to the problem of surplus agricultural production. The crops produced on the projects are in the main not those staples which are overproduced. A large part of the project crops is consumed in the west itself, and the staples produced on the projects have been absorbed by the increased consumptive requirements of the west directly attributable to irrigation development.

Beach City Dam Will Be Let Feb. 21

THE U. S. ENGINEERS at Zanesville, Ohio, will receive bids February 21 for the construction of the earth-fill Beach City Dam near Beach City, Stark County, Ohio.

The principal items of work are: diversion of river during construction; stripping in stream channel and for embankments, 71,000 yards; common excavation, 475,000 yards; channel relocation, 55,000 yards; excavation in borrow pits, 728,000 yards; rock excavation, 146,000 yards; impervious fill in dam, 470,000 yards; pervious fill in channel and embankments, 405,000 yards; and placing approximately 31,000 yards of concrete and 600 tons of reinforcing steel.

Twenty-nine Million for Mississippi

MAJOR GENERAL E. M. Markham, Chief of Engineers, has recommended an appropriation of $16,318,000 for Mississippi River flood control in the War Department bill for the fiscal year beginning July 1, 1935. The estimated carry-over on that date will be $12,588,000, thus giving a total of $28,906,000 for the next fiscal year. Among other items recommended by Gen. Markham for inclusion in the War Department appropriation bill are the following: $35,000,000 for locks and dams in the Mississippi River between the Missouri River and Minneapolis; $20,000,000 for continued construction at Ft. Peck, Mont.; $15,974,000 for dikes and revetments in the Missouri River, Kansas City to Sioux City; $2,200,000 for dikes and revetments in the Mississippi River between the Missouri and the Ohio; $2,402,000 for dikes and revetments in the Missouri River, Kansas City to the Mouth, and $1,200,000 for open channel work in the Ohio River.

Soil Erosion Program Enlarged

CARRYING forward the Federal campaign to halt destruction of national land resources by soil erosion, Secretary of the Interior Harold L. Ickes recently approved the establishment of seven new erosion control districts in Colorado, South Dakota, New York, Arkansas, Georgia, Virginia and Oklahoma.

The new projects, selected on the recommendation of H. H. Bennett, Director of the Soil Erosion Service, will be carried out with an aggregate allotment of $910,000 from Public Works funds previously made available to the Service by Secretary Ickes. Work will

be started as soon as the necessary organization can be perfected in each area.

Including the new projects, the Soil Erosion Service is now conducting thirty-nine erosion control projects throughout the country, ranging in size from 15,000 acres in the case of the Dalhart, Texas, wind erosion project, to 16,000,000 acres in the Navajo Indian Reservation in Arizona and New Mexico. At least one, and in most cases several, projects are now actively under way in every region of the country where the ravages of erosion have been severe.

Progress on Public Works Highways to January 19, 1935

PROGRESS MADE on emergency construction of public works highways to January 19 under the supervision of the U. S. Bureau of Public Roads shows a total of 546 projects, estimated to cost $25,133,000, approved but contracts not yet awarded; 859 projects, estimated to cost $34,922,000, awarded but not yet under construction; 2,426 projects, estimated to cost $149,084,000, under construction; and 7,552 projects completed at a cost of approximately $331,745,000. The 2,426 projects under construction involve 6,953 miles of road and are giving regular direct employment to 88,761 men.

Quarry Accidents Increase

THE QUARRYING industry of the United States, including such related work as rock-crushing, rock-dressing, and the manufacture of cement and lime, experienced a higher accident rate among its employees during 1933 than during 1932, according to final figures compiled by the United States Bureau of Mines from reports received from operating companies. Operations covering the quarries alone showed an increase of 13 percent over the rate for the previous year; operations outside the quarries reported an increase of more than 3 percent. Among the larger quarrying states, those making the best progress in safety compared with their own individual records for the previous year were Tennessee, Alabama, Maine, Georgia, and Minnesota. Each of these states reduced its accident rate at least 24 percent in 1933.

Foreign Notes

South Africa

The illustration above shows operations on the Vaal-Hartz Irrigation project under construction by the **Irrigation Department** of the Union of South Africa. Plans call for the construction of a canal 97 miles long, 23 feet wide at top, 18 feet wide at bottom, 6 feet deep, and a 15-foot berm on both sides. The canal, which will be lined with concrete throughout its entire length will carry water to Johannesburg in addition to supplying water to irrigable areas along the route. The illustration shows a Caterpillar Diesel 40 pulling a Caterpillar elevating grader, and a Diesel 35 pulling a blade. The grader does the excavating while the blade pushes the dirt back away from the bank. The project involves 750,000 yards of excavation which must be moved twice in order to leave the 15-foot berm specified.

Czechoslovakia

According to information received from Sam E. Woods, Commercial Attache for the U. S. Department of Commerce at Prague, at the beginning of 1934, Czechoslovakia had a total of 69,474 kilometers (43,421 miles) of roads, of which 8,656 were State roads. The following road machinery was owned by the Government at the close of the year: 64 steam rollers, 46 rollers with kerosene engines, 33 gasoline-driven rollers, 9 hand rollers, 54 scarifiers, 126 tool wagons, 44 coal wagons, 419 tar machines, 8 automotive sweepers, 40 small sweepers, 99 horse-drawn snow plows and 11 tractor snow plows.

Canada Notes

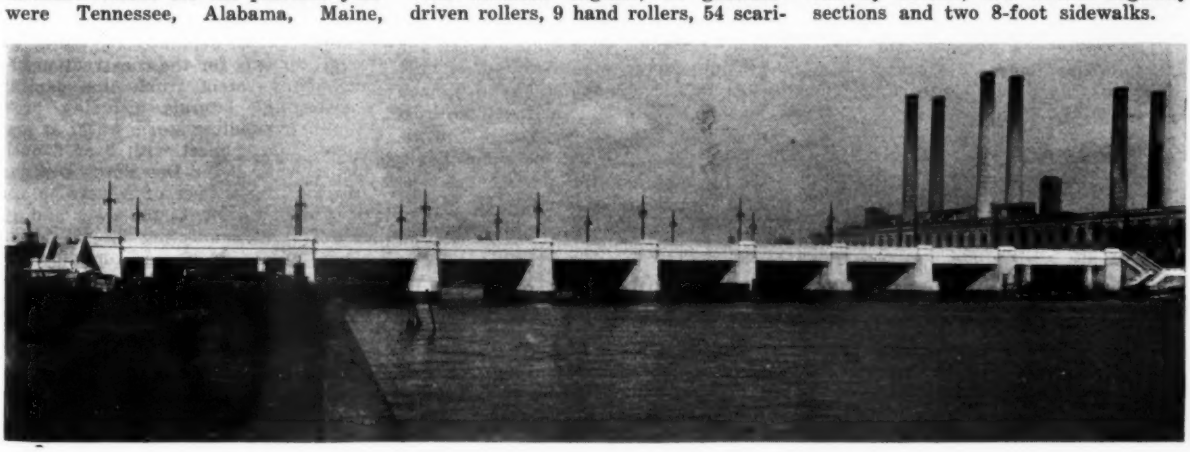
Ontario

By H. F. UNGER

After being closed for two years, the **Queenston quarries** at Niagara Falls have reopened with a force of twenty men which will be soon increased to thirty men. It is understood that this company has been given the contract for stone on the new eighteen-story Hydro building in Toronto.

Washington and Vicinity

The October 1933 issue of Excavating Engineer described the interesting methods used by the **Kaufman Construction Company** of Philadelphia in building the Benning highway-railroad bridge over the Anacostia River at Washington. A view of the completed bridge is shown below. In order to avoid interruption to heavy traffic over the highway bridge and the double-track railroad bridge belonging to the Washington Railroad and Electric Company, the new bridge was constructed one section at a time. This was done by building the north, highway half of the bridge first, then the section for the railroad tracks in the middle, and finally the south half of the highway portion. The new bridge has a total length of 541.5 feet between abutments with a total width inside the parapet walls of 104 feet allowing space for a 22-foot railway section, two 32-foot highway sections and two 8-foot sidewalks.



Pennsylvania Notes

The above two photographs show stripping operations in the anthracite field near Audenried where the **Dick Construction Company** of Hazelton is working on a large contract. At the left, a Bucyrus-Erie 43-B gasoline shovel is loading overburden into LaPlant-Choate wagons pulled by Caterpillar Diesel Seventy-five's. At the right a Bucyrus-Erie 120-B electric shovel is digging rock.

The John T. Dyer Quarry Company announce the removal of their general offices to Birdsboro, Berks County, and their sales office to the Commercial Trust Building, Philadelphia.

This snapshot was sent to us from the coal fields. Apparently the shovel has to dig its way up the hillside, casting the boulders to one side as it progresses. **Hill & Suender** of Frackville operate this Bucyrus-Erie 43-B which is powered with a Buda Diesel engine, on a stripping project near Coaldale.

Ohio Notes

By H. F. UNGER

A **$336,462,000 waterway improvement program** for the Great Lakes district has been detailed in a report submitted by the Great Lakes Division of the U. S. Army Engineers. This report would provide for 100 million man-hours of work distributed over a period of seven years and would make Cleveland a port for ocean commerce. The proposed program includes the building of eight ocean-going ports on the Great Lakes. In Cleveland, this would mean the dredging of a 27-foot channel from the breakwater entrance to the East Ninth street pier, Cleveland's ocean terminal, at a cost of $180,000. As already reported, dredging, at a cost of $619,000, is going on as a separate project in the outer harbor in Cleveland, as well as the dredging of a 16-foot channel to the municipal dock at Lorain at a cost of $118,000.

Work has been started on the new Lorain Road Bridge over Rocky River by the **Lowenshon Construction Company.** The new span, which will cost approximately $550,000 will replace the present 30-year-old structure.

Surveys are being made for a **new highway** which will eliminate the serpentine curves of Lake Shore boulevard in Cleveland and Euclid Village. The plan calls for a four-lane road paralleling the New York Central's tracks. The plan will be submitted to the State Highway Department as soon as County Surveyor John O. McWilliams has completed preliminary work on the plan.

Illinois Notes

By A. J. KOENIG

Jos. Kesl & Son were awarded a contract by the Madison County Supervisors for paving the highway between routes 157 and 159 west of Edwardsville for $104,748.

P. H. Wall Contracting Company, St. Louis, received a contract to construct 30,500 feet of 8 to 15-inch sewers and sewage disposal plant at Red Bud.

The Aurora Sanitary District is taking bids February 6 for a sewer system at an estimated cost of $133,000.

St. Louis and Vicinity

By A. J. KOENIG

Bids were received January 26 for **grading the relocated** U. S. Highway No. 40, in St. Charles County, Missouri. The new route, 13 miles long, calls for bridges over four large creeks and also a bridge over the Rock Island Railroad and Bonhomme creek at Chesterfield, St. Louis County.

Bids will also be asked for soon for **grading an additional five miles** between the Missouri River and Bellefontaine. This will be very heavy work.

The Highway Commission plans to **construct a bridge** across the Black River at Poplar Bluff, Mo.

Martin & Riley submitted low bid of $12,459 for the construction of a culvert and channel improvements for the River Des Peres Parkway between Lansdowne and Loughborough Avenues.

The City of Shrewsbury, St. Louis County, E. C. Jenkins, city clerk, will soon ask **bids for the construction** of a complete system trunk line sanitary sewers and laterals including provisions for handling storm water at main points and connect with 2 or 3 outlet points with River Des Peres Drainage Works; 20,800 feet of sewers to connect with the St. Louis sewer and 48,000 feet of connecting lateral sewers.

The St. Louis Board of Public Service has **plans for a bridge** to carry River Des Peres Parkway over Watson Road. Bids will be asked for at an early date.

Tobin-Walsh Construction Company was awarded a contract to lay 39,880 feet of concrete sewers at Joplin, Mo., for $79,518.

YOU may be able to add to your profits as much as 50 per cent of your present drilling costs . . . many owners report savings of half or even more. Bucyrus-Armstrong drills are making good on tough jobs all over the world. There are definite, understandable reasons for their outstanding performance. Why not find out now what these modern all-steel blast hole drills can do for you?

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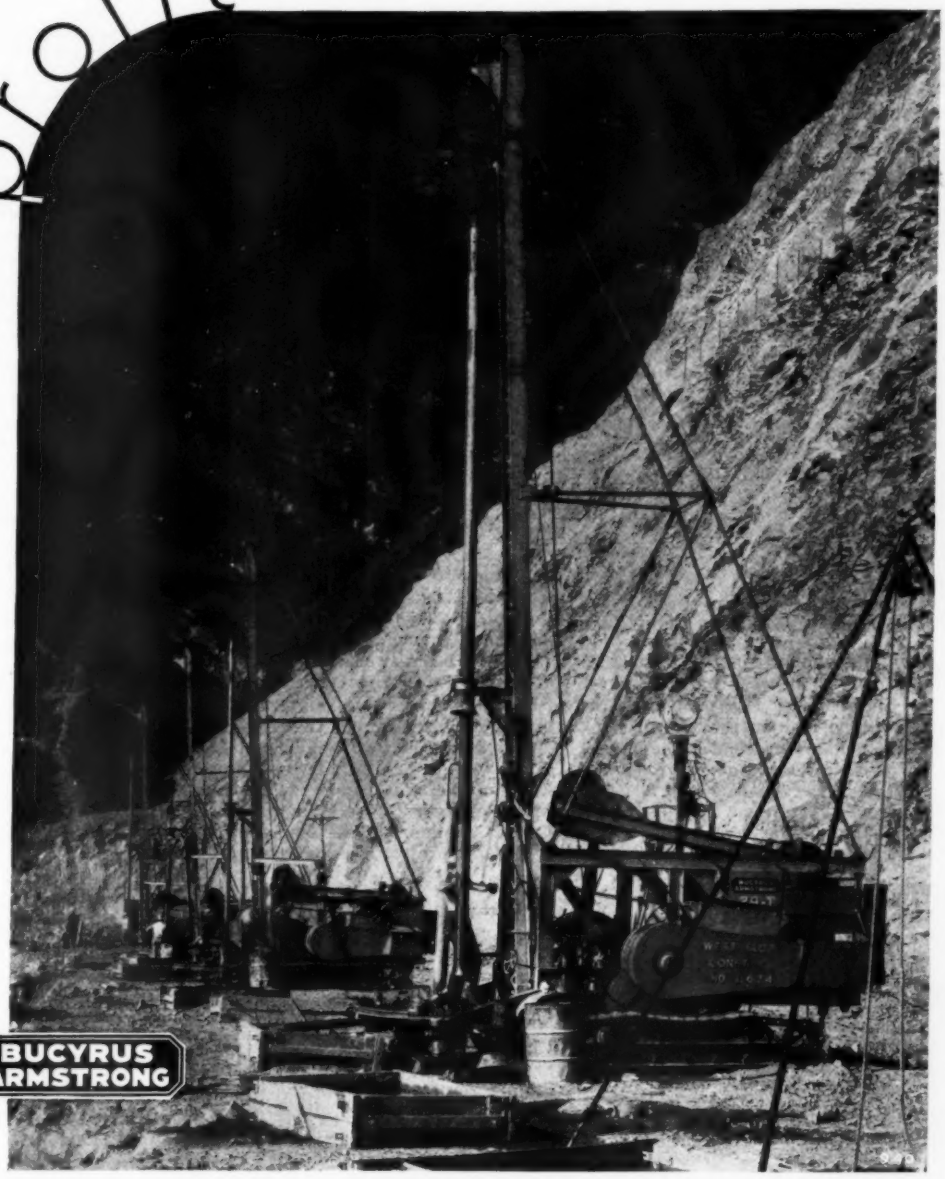

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Shots From the Firing Line—*Continued*

The Wabash Railroad Company has applied to the Interstate Commerce Commission for permission to obtain a loan of $2,350,000 with which to complete a double-track reinforced concrete bridge across the Missouri River between St. Charles and St. Louis Counties.

TVA Notes

Quarry operations at Norris Dam are in full swing. The accompanying illustration shows a Bucyrus-Erie 75-B electric shovel digging rock. To the right, an Allis-Chalmers tractor with bulldozer keeps the quarry floor clear of stones and boulders so that the hauling equipment will have smooth going.

Behind the shovel an Ingersoll-Rand wagon drill is at work on a ledge of rock. Shown below is a portion of the rock storage pile at the Dam. Rock from the primary crusher at the quarry is conveyed to the secondary crusher at the right. After passing this crusher the conveyor carries the rock up the incline to the discharge belt. Here the rock is stored by sizes. An Allis-Chalmers Model "K" tractor spreads the heap from under the belt.

River Notes

Memphis District

At a letting December 27, **Louisiana Materials Company** of Baton Rouge submitted low bid of 14.6c for the construction of 1,000,000 yards of earthwork in the White River Levee.

New Orleans District

McWilliams Dredging Company of New Orleans submitted low bid January 22 of 21.9c per yard for the construction of 3,100,000 yards of earthwork in the East Atchafalaya Basin Protection Levee.

Texas Notes

During the past year **dredges removed 24,148,065 yards** of earth in widening and deepening the Houston ship channel, and at the end of the year 24 miles of the Bay section had been completed to a width of 400 feet on the bottom and depth of 34-35 feet. From Morgan Point up the channel was deepened to 34-35 feet for 8 miles with a width of 160 to 250 feet on the bottom. Contracts provide for completion of the entire waterway to usable depth of 32 feet (dredging to 34-35 feet) during 1935.

Congress has been asked to further improve the channel by widening to 300 feet from Morgan Point to Baytown (5 miles), 250 feet thence to Norsworthy (13 miles) and 200 feet to the Turning Basin (7 miles), and to increase usable depth to 34 feet—dredging to 36-37 feet.

Colorado Notes

By H. M. BIBAUD

A budget prepared by the State Highway Advisory Board for expenditure of $6,971,000 on the **construction and maintenance of highways** during 1935 has been approved by Governor Johnson. Expenditures on large projects on main arterial highways is an outstanding feature of the program.

The **3-mile highway link** from Loveland west toward the Big Thompson Canyon road was completed December 18, 1934, according to William Bausler, County Commissioner. This link joins a Federal project making an approach to the canyon and it completes a road from Greeley to the main entrance. A new project is expected to start in the Canyon early in January.

L. Leone of Trinidad was low with a bid of $19,832 for 1.144 miles of surfacing between Colorado Springs and Florence.

The Highway 59 Association was organized December 11, 1934 at Lamar, at a meeting attended by representatives of more than a dozen southeastern Colorado towns. State Senator, Guy Hudson of Wiley was elected President. State Representative, M. E. Strain presided at the meeting and Gerald Wood acted as Secretary. L. M. Appel, Chairman of the Roads Committee recently named by Governor Ed. C. Johnson, delivered an important address. Highway 59 runs north from Oklahoma through Springfield, Lamar, Eades and Kit Carson.

Contracts have been let by the State Highway Department for **grading and surfacing 18 miles of highway** which follows the old Santa Fe Trail between La Junta and Denver.

The Kirchhof-Hanes Construction Company of Denver was low with a bid of $169,438 on 12.749 miles of grading and surfacing on Highway No. 12 between Simpson and Delhi.

The Larson Construction Company of Denver was low bidder on 3.946 miles of gravel surfacing between Benton and Timpas in Otero County for $60,366.

The transmountain water diversion project of the Twin Lakes Reservoir and Canal Company, just south of Leadville, became a major irrigation project with **an additional loan of $875,000** recently announced by Washington. The new loan increases the amount to be spent on the project to 2 million dollars. The amount of water developed will be nearly doubled. The first loan was made in 1933 and is being spent for a tunnel through the Continental Divide. The tunnel will tap one branch of the Roaring Fork and divert the water into Twin Lakes on the eastern slope, the property of Crowley County farmers. The loan will allow for drilling a second tunnel through a mountain spur and tap the main fork of Roaring Fork River. The second tunnel will be two miles long and will help feed the main tunnel. A portion of the $875,000 will be used for building a diversion dam to the main fork of Roaring Fork River. The main tunnel is being built under contract, by **Platt Rogers, Inc.** of Pueblo. The new tunnel will be under separate contract according to Frank N. Bancroft, special attorney for the Canal Company.

South Dakota Notes

By LESLE REESE

The State Highway Commission has made the following awards:

Paving—to the **Summitt Construction Company** of Summitt, and the **Central Construction Company** of Sioux Falls, 4.824 miles of paving for $105,-

Resharpen Your "Jackbits"

You can resharpen "Jackbits" to the next smaller gauge by means of the "Jackbit" Grinder. Most sizes can be resharpened three times.

"Jackbits" are a distinctive form of detachable rock drill bits developed and manufactured exclusively by Ingersoll-Rand. The patented thread makes them easy to detach.

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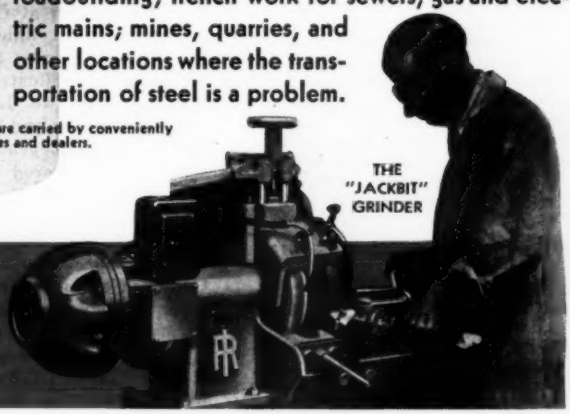
Large stocks of "Jackbits" are carried by conveniently located branches and dealers.



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Shots From the Firing Line— *Continued*

710 on U. S. highway 16 west of Alexandria, and 5.088 miles on U. S. 77 north of Elk Point for $112,956.

Gravel basecourse—to **Lee & Johnson, Inc.**, Sioux City, Iowa, 8.742 miles on U. S. 12 for $11,472; to **Lindekrugel & Kolberg**, Spencer, 4.437 miles on U. S. 14 for $7,316; and to **Hector Construction Company** of Hector, Minn., 6.927 miles on U. S. 281 north of Redfield for $17,614.36.

Governor Berry and the State Highway Commission have announced a "ten-year plan" for **building hard-surfaced highways and feeder routes** throughout the state. In a program submitted to the Governor, to which he gave his approval, the Commission suggested that the first projects call for black-top and high-type pavement on U. S. 16 and 14 across the state east and west. These highways, hard-surfacing of which is estimated to cost $4,650,000, will connect with trunk highways from Minnesota and Iowa. One of the proposed hard-surfaced highways would go from Brookings, through Huron, Pierre and Phillip to Rapid City while the other passes through Sioux Falls, Mitchell, Chamberlain and Kadoka to Rapid City. While these projects were recommended for immediate action, the Commission pointed out that routes running north and south to connect other cities with the two main highways would be built afterwards. An allotment of over $2,000,000 was given South Dakota recently for highway building purposes but it has to be matched dollar for dollar by state funds before it can be used.

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Fort Peck Dam Notes

Mason-Walsh Company, driving the four pilot tunnels, made a record advance of a total of 179 feet for one day on January 11. The pilot bore for the longest tunnel (7,150 feet) has reached a distance of 3,355 feet into the shale bluffs. 11,705 feet of pilot tunnels have been driven up to January 21 out of a total of 24,650 feet required. All of the eight pilot shafts have been completed as far as they are scheduled to go for the present. The pouring of concrete at the downstream portals was suspended temporarily because of extreme cold weather. A total of 38,141 yards has been poured for the headwalls.

The volume of earth excavated for the spillway during the week of January 7 to 12 exceeded previous records. **Martin Wunderlich**, contractor at the lower (river) end, averaged about 10,000 yards per 20-hour day. The four shovels now in operation are getting down to firm shale. Preparations are being made to loosen this material by drilling and blasting, since it is too solid for the shovels to handle.

Spillway Builders, Inc., who have approximately 10,000,000 yards of excavation in their contract, averaged about 20,000 yards per day during the past week, working four 5-hour shifts, seven days a week.

The employment figures for January 15 show **5,072 persons** on the payrolls.

The movement of gravel for the toes of the dam increased during the past week due to completion of repairs to the gravel plant at Cole, Montana operated by **J. L. Shiely Company** and the **Becker County Sand and Gravel Company**. The illustration above shows one of their two Link-Belt portable gravel screening and loading plants being fed by a Bucyrus-Monighan Model 6160 Diesel-powered walking dragline. The plant returns the sand to the pit, feeds the oversize to trucks for disposal, and loads the gravel directly into the gondolas. Two other draglines of this type are in operation serving another portable screening plant and a permanent washing plant where concrete aggregate is prepared. In one week a total of 1,114 carloads of gravel was shipped from this plant.

Grand Coulee Dam Notes

By GRACE KIRKPATRICK

David H. Ryan of San Diego, who did the excavating of the overburden at Grand Coulee Dam, and who also built the United States Construction railroad from Odair to the damsite, was low with a bid of $110,505, January 5, on excavation to relocate a part of the railroad to the damsite. Relocation was made necessary by a slide. Mr. Ryan bid 24 cents a yard on 347,000 yards of dirt, $1.25 a yard on 114,000 yards of rock, and 1½ mils a yard on 8,650,000 yards of overhaul.

A contract for drilling into the slide area on top of which is located the grade for the joint highway and railway leading down to the damsite, was granted **Lynch Brothers**, core-drilling firm of Seattle, by MWAK recently. The contract will entail more plain drilling rather than diamond drilling work through the granite foundation underlying the overburden at the damsite here. Holes will be bored through the earth strata to determine if the water table underneath the slide mass is draining satisfactorily.

By KARL STOFFEL

With little more than two months elapsed since official notice was given to go ahead, the **Mason-Walsh-Atkinson-Kier Company** are rapidly reaching top speed on their $29,339,350 dam contract. Twenty-five hundred men, including engineers, are working on various phases of the development. Officials of the Reclamation depart-

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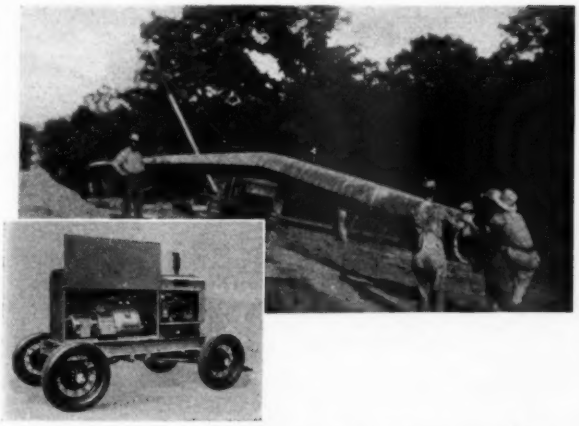

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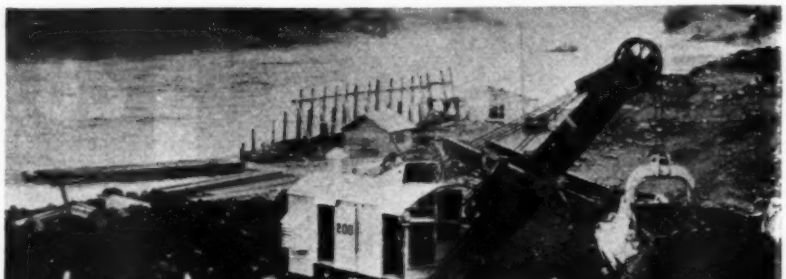
ment anticipate the operations will reach a peak by the first of the year.

A conveyor system by means of which the contractors expect to move the greater portion of the 11,000,000 yards of common excavation material, is being installed as shown below at the right. This belt conveyor is expected to replace trucks to a large extent when in operation. The Jeffrey Manufacturing Company of Ohio supplied the equipment for this $200,000 conveyor, the largest ever used on any construction job. Harvey Slocum, construction superintendent for the MWAK company, said he expected the removal of 50,000 yards daily with this machinery which will be fed by a battery of large capacity shovels. The main conveyor belt, five feet wide and built in synchronized sections of 175 to 225 feet long, will be fed by a series of laterals four feet wide. A similar system will be installed on both sides of the river although the east side will be excavated after the west side system is in operation.

While waiting for completion of the conveyor system MWAK keep three shovels and a fleet of 10-yard trucks busy moving dirt for the foundation of the dam and powerhouse. The picture, below at the left, was taken on the west bank. Where the shovel is working, excavation will be carried down to a depth of 200 feet. Speed is the pass-word here. On ninety degree swings this shovel has been timed loading five 10-yard trucks in 7 minutes. Above on the ledge a Northwest shovel may be seen working on the Krick and Kunney rail-highway contract.

Work on the east shore cofferdam has also been started and will be one point of concentration for the winter and spring. The first concrete is expected to be poured by June of 1935 and the unusual rise and fall of the river is not expected to hold up work owing to the height of the cofferdams which will require 300 carloads of steel piling. Specifications call for driving the piling to a depth of 100 feet in places. It is estimated that 18,000 cars



of cement will be required on the dam construction.

Houses of the contractors' camp, to be known as Mason City, have been going up rapidly and the town will be completed in December. The first contract covered 350 buildings, including dormitories, a mess hall capable of handling 1000 men and administration building. This entire city will be electrically heated and lighted, power being furnished by the Washington Water Power Company.

Houses of the engineers' town, directly across the river from the contract camp, are also going up rapidly, the first group of 30 being built by the National Construction Company of Tacoma and another contract for 30 let to the McDonald and Gunmere Company, also of Tacoma.

Bonneville Dam Notes

Trucks have played an important part in moving the huge quantities of rock and dirt excavated from the powerhouse site and locks. Over 4 million yards of dirt and 2 million yards of rock are called for in the contract. **Guy F. Atkinson Company**, contractor on the powerhouse and lock project has used 3 Sterlings with 9-yard bodies and 5 Macks with 12-yard Isaacson rock bodies with Wood hoists. In addition **Brown-Camillo Company**, a subcontractor, operated a fleet of 6 Macks, duplicates of Atkinson's. The Mack trucks are patterned after those used at Boulder Dam. They have a "crow's nest" with auxiliary throttle and control equipment which the operator uses when backing up under the shovel or at the dump. This permits him to look over the high, wide truck body and has proved to be extremely helpful in preventing accidents and speeding up truck movements. Illustrated above Columbia Construction Company's Bucyrus-Erie 75-B shovel is loading one truck while another takes its position in this two-truck spotting arrangement.

The Columbia Construction Company is constructing the largest cofferdam yet attempted. Frame cribs 70 feet high by 60 feet square will be constructed of 12x12 timber, and built up as rock dumped into them causes them to sink to a final depth of 30 to 40 feet, after which a facing of sheet steel will be placed on the completed cribs.

Boulder Dam Notes

By J. R. MARCY

The start of the New Year found Boulder Dam breaking more records for construction speed. The **Six Companies'** crews, working under Superintendent Frank Crowe (better known as "Hurry-up" Crowe, for obvious reasons), have passed the 3,000,000-yard mark in pouring concrete, and the giant structure is really beginning to look like a dam. Specifications called for commencement of concreting on December 1st, 1934. Actually, the work started on June 6, 1933, and a few weeks more will see all concrete in place. Supposed to require 975 days to finish, indications now are that the actual building time on the dam will be less than 600 days. Walter R. Young, Bureau of Reclamation Construction Engineer on the project, expects storing of water back of the dam to begin very shortly. He estimates that, with a normal runoff from the Colorado watershed, a lake will be formed this year containing more than 10,000,000 acre feet of water, extending over 90 miles upstream and having a depth of more than 300 feet at the dam.

California Notes

By H. L. LIVINGSTON

The following contracts have been awarded by the Division of Highways: **Union Paving Company**, San Francisco, $201,213 for 1.7 miles grading and paving in San Mateo County; **A. J. Raisch**, San Jose, $56,930 for 2.6 miles grading and surfacing in San Benito County; **J. R. Reeves**, Sacramento, $46,450 for 1.5 miles grading and paving in Amador County; **Griffith Company**, Los Angeles, $35,455 for 1.5 miles grading and paving in Los Angeles County and **Harms Bros.**, Sacramento, $82,984 for 10.5 miles grading and oiling in Lassen and Sierra Counties.

The following contracts have been awarded by the Metropolitan Water District of Southern California for the construction of No. 1, 2 and 3 Monrovia tunnels and Pasadena tunnel.

Schedule 1—**West Construction Company**, Los Angeles, $528,100 for Monrovia No. 1 and 2 tunnels and appurtenant works. Length of tunnels are 7865 and 940 feet, and Schedule 2—$1,782,400 for Monrovia tunnel No. 3, 32,114′ long; Schedule 3—**L. E. Dixon, Bent Bros.**, Johnson, Inc., Los Angeles, $621,180 for construction of the Pasadena tunnel.

The City of Ventura will hold a special election in February to vote $1,150,000 in bonds to finance **construction of the Hoffman Dam.** This structure will be 87 feet in height with a reservoir capacity of 9,800-acre feet. This dam will be so constructed that it can be raised to 130 feet and have a capacity of 42,000-acre feet.

The Verde Irrigation and Power District may receive an $8,000,000 P.W.A. loan to replace a $19,000,000 allotment which was rescinded October 15th.

R. Park Lamborn, who has for some years been assistant to **A. J. Maclean**, General Purchasing Agent of the **Kennecot Copper Company** and other Jackling interests, has been transferred from the San Francisco office to the New York offices of the Utah Copper Company at 25 Broad Street, New York City.

Southern California Notes

By J. R. MARCY

Another factor has entered into the problem of redesigning San Gabriel Dam No. 1. In answer to a statement by Chairman Legg of the Los Angeles County Board of Supervisors, to the effect that competitive bids might be called for additional work in the new design not covered by the present contract, the **West Slope Construction Company** say that they will consider any such attempt as a breach of contract. An excerpt from their letter to the Board states: "This contract was awarded pursuant to public letting under the severest competition against most of the largest contracting firms in the country, and we have invested in a special plant installation for it costing almost $1,000,000. While we stand ready and willing to co-operate with you to help you out of your difficulties and to treat you fairly in every respect, we cannot be expected to per-

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mit the Flood Control District to disregard its obligation and breach and terminate this contract without fully compensating us for all the loss and damage we would be subjected to." Work was suspended on the structure on November 14, last, for 120 days, to permit the County to draft a redesign of the dam that would allow use of rock for the fill now considered as waste. Since the chief feature of the redesign was projected to be a considerable widening of the base of the dam, work additional to the present contract seems a certainty.

The Los Angeles City Council has received notification that State and Federal Aid will be given five city projects totaling $375,000 in cost. The projects are: grading and paving Marengo avenue, $35,000; Marengo avenue bridge, $110,000; resurfacing of Sunset Boulevard from Figueroa street to Hillhurst avenue, $60,000; a bridge on San Fernando road near the Cascades, $20,000; and grading and paving in the O and N streets project in Wilmington, $150,000.

Recommendations of the California State Highway Commission for Riverside County for the next biennium included close to $1,000,000 for road and bridge building projects. Among the principal projects were the following: continuance of the Riverside-to-Beaumont section of Highway 60, 8.9 miles, $167,000; construction of a new overpass for the highway at the Southern Pacific tracks west of Beaumont, $3,000; reconstruction of 10 miles of highway from Indio west to the intersection of the Pines-to-Palms Highway on the Indio-Palm Springs route, $140,000; removal of dips in the highway between Beaumont and Cabazon, $67,000; rebuilding of the highway between Banning and Whitewater, $150,000; rebuilding the route between Palo Verde and Blythe, $50,000; widening Mission Highway between Riverside and Ontario, $40,000; rebuilding 2.3 miles of highway through the San Timoteo Canyon hills to Moreno Valley, $43,000; rebuilding approximately 7 miles of the Beaumont-Redlands highway from Beaumont to the San Bernardino County line, $77,000; reconstruction of 9 miles of highway from the Riverside-Imperial County line to Avenue 62 near Coachella and care of the storm water problem, $78,000; bridges across the Santa Ana and San Jacinto rivers, near Corona and Elsinore, respectively, $46,000.

The **greatest public works construction era** in history is in prospect for Southern California during 1935. By far the largest volume is that scheduled for the Colorado River Aqueduct, where expenditures for 1935 are estimated at $45,000,000, exclusive of Parker Dam. Los Angeles County has road projects estimated at a total of $1,318,000, sewer projects estimated at $2,454,560, and storm drain work totaling $3,400,900. For the Los Angeles Flood Control District a program involving $30,895,400 is planned. Harbor improvement in the 12th U. S. district, which includes the Los Angeles breakwater extension, Newport Harbor improvements, and extensive work at San Diego, will involve an estimated expenditure of $8,000,000 during the year. Miscellaneous projects in Southern California cities and counties comprising street and road work, sewers and storm drains, total around $15,000,000, part of which will be PWA and SERA money, if made available as expected.

By K. CAMPBELL

Orange County Supervisors, City Councilmen, and City Engineers of Newport Beach officially welcomed the huge hydraulic dredge, John McMullin of the San Francisco Bridge Company when it steamed into the Newport Harbor to begin the **$1,000,000 dredging project** in removing 8,127,000 yards of sand from the bay. This barge will dredge a turning basin for the U. S. hopper dredge which is to dredge the bar from the entrance to the harbor. The **Standard Dredging Company** of Los Angeles expects to start work shortly on the upper end of the bay.

Colorado River Aqueduct Notes

By J. R. MARCY

On January 17 the **Wenzel and Henoch Construction Company** were notified that their contract for the construction of the 12.7-mile San Jacinto tunnel on the Colorado River Aqueduct had been suspended by General Manager F. E. Weymouth of the Metropolitan Water District. The action was approved unanimously by the District's board of directors, on the grounds that work on the tunnel had been "unreasonably and unnecessarily delayed." According to Weymouth, "The San Jacinto tunnel contract was signed on March 17, 1933, and was to be completed on December 17, 1938, the time when the entire aqueduct is to be completed and water made available for the district. Although approximately 30 per cent of the contract period has expired, the work on the San Jacinto tunnel is only about 17 per cent completed. The topographic conditions are such that it is necessary to drive 8.2 miles of tunnel between two shafts of this section, and of this 8.2 miles, less than one mile has been excavated. Only 28 feet of this critical portion were excavated in November, only 127 feet in December, and none to date in January, as against a rate required for timely completion of at least 800 feet a month." The contract price of the San Jacinto tunnel amounted to $7,339,100; in addition to this amount the District would be required to furnish materials, supplies and engineering, making the total estimated cost $9,900,000.

By K. CAMPBELL

West Construction Company expects to complete the concreting of Whitewater tunnels No. 1 and No. 2 shortly. Excavation was concluded last month on both tunnels, totaling 10,232 feet.

J. F. Shea is progressing rapidly with the concreting of the Cottonwood tunnels, first to hole through on the project. These tunnels total 20,105 feet in length. They averaged 610 feet per month on a 6-day week.

Walsh Construction Company crews holed through two tunnels at the end of last year. The Colorado River tunnel, most easterly of all bores, was driven through December 22. It is 5,514 feet in length. The 11,580-foot Copper Basin tunnel No. 2 was completed December 30. As the Copper Basin No. 1 tunnel was drilled through a month before, only one of the four

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bores being drilled by this company remains to be finished. This is the Whipple Mountain bore, 32,265 feet long, which is half finished. An all-time All-Aqueduct record was established by the Walsh crews working on Copper Basin No. 2 heading when they averaged 12.3 feet per shift in drilling 1,111 feet in 30 days.

Dravo Construction Company have started concrete arch work on Valverde No. 1 after holing through between No. 1 and No. 2. Vice-President E. T. Gott has returned to the job.

Morrison-Knudsen have nearly completed concreting the 5,940-foot Mecca Pass tunnel.

Broderick and Gordon have reached the three-quarter mark in drilling their Eagle Mountain tunnel.

Hamilton and Gleason expect to complete excavations this month on the Bernasconi tunnel, 6,220 feet in length, through granite.

The two-mile mark has been passed on the West Iron Mountain bore being drilled by the **Utah Construction Company.**

More than **five hundred members** of the Southern California Chapter of Associated General Contractors and representatives of the Metropolitan Water District met at the Biltmore for the Aqueduct dinner of the AGC. Lynn Atkinson, prominent Southern California contractor, presided. Manager F. J. Connolly of the AGC pledged continuance of the fine relations now existent between the two bodies. J. C. Agnew of Winston Brothers, responded to General Manager Weymouth's talk on the District's problems by stating that the members of the AGC wished to express appreciation of the policy which has resulted in the award to members of that organization of contracts in the amount of forty-eight and one-quarter million dollars.

The Hanrahan Company, Youdall Construction Company, Elliott, Stroud Brothers & Seabrook, Charles Harlowe Jr., and C. M. Elliott will operate under the name of the **Aqueduct Construction Company** with offices in the Rives Strong Bldg. in Los Angeles. They were awarded a contract under specifications No. 70.

Morrison-Knudsen were awarded the contract for the building of the Big Morongo and San Andreas siphons for $327,189. This contract covers nearly two miles of concrete construction work. The Big Morongo siphon will be located near the west portal of Morongo tunnel No. 2, most westerly of the bores on the Coachella division of the aqueduct. The San Andreas structure will be built near the east Whitewater tunnel No. 1.

Parker Dam Notes

By K. CAMPBELL

It appears that **work on Parker Dam will be suspended** at least until April 1, following a suit filed by the Government in the Supreme Court to restrain Arizona from interfering with construction of the dam. Arizona was instructed to reply to the Government brief by April 1. The petition said that it was essential that the excavation for the foundation of Parker Dam to the depth of 240 feet below the present bed of the Colorado River be completed and that all subwater work on this structure be constructed and finished during the period in which Boulder Dam is under construction and before its operation.

All-American Canal Notes

By K. CAMPBELL

Work on the giant All-American Canal has pushed forward rapidly since the formal opening of the project, December 16. Three years from now it is expected by the Imperial Valleyites that all threat of drouth and flood will be ended forever with the completion of the canal, to be built at the now estimated cost of about $30,000,000, of which $6,000,000 has already been appropriated by Congress. The total excavation on the main canal is estimated at between 65 and 70 million cubic yards of which only 3 per cent is rock. Construction work is now in progress along a 75-mile front, employing thousands of horses and mules and hundreds of men (a great many of them, farmers using their own teams); big Bucyrus-Monighan draglines, some of them with 185-foot booms, and buckets holding 14 yards; and immense 25-yard tractor-drawn trucks. The main canal capacity will be 15,000 second feet. Thirty miles of this 80-mile ditch is now under construction. This will have a bottom width of 130 feet, with a width at the water surface of 200 feet. It will be 22 feet deep.

Water for the canal will be taken in at the new diversion dam which is in reality a weir, but will be known as Imperial Dam, located four and one-half miles up the Colorado River from Laguna Dam. Originally it was planned to have the intake at the latter, but finding it desirable to locate the dam at a higher elevation in order to reduce the amount of excavation, a higher location was found for diversion. The Imperial Dam raises the elevation some 22 feet. Both dams are of the same type, but Imperial is less than one-half the length of Laguna Dam. It is essentially a broad, flat, rock-filled dam covered by a concrete slab 18 inches in thickness, with crest 1,770 feet long. The elevation of the crest of the dam will be approximately 180 feet above sea level.

On the west side of the river and an integral part of the dam will be located the six desilting basins. Each of these can pass 9,000 second-feet of water without interruption of canal diversion and desilting operations. Five basins are to be used for diversion to the canal while the sixth is being sluiced, each to be sluiced in turn. One of the major costs to farmers of the valley has been the handling of silt in the canals and on the land. Furthermore, the present slope of the river is about 1.2 feet per mile, while the slope of the canal will be approximately 5 inches to the mile which means the heavier silt transported by the river would not be transported by the canal. With the completion of Boulder Dam the major part of the suspended silt will be eliminated in a short time. However, the river will bring down bed silt for some years to come. Each of these desilting basins will be 1,200 feet long and 110 feet wide at the bottom. At

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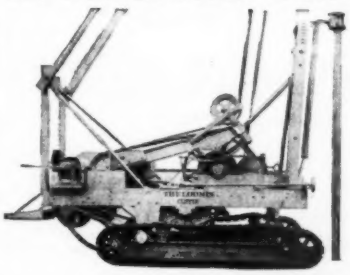

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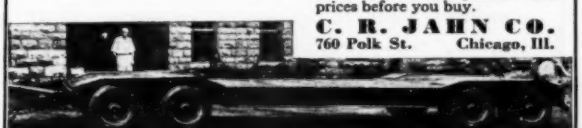

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the lower end of each basin will be a double set of gates, the upper gates leading to a flume connecting to the canal and the lower ones for sluicing the accumulated silt from the basin to the river below the dam. It is estimated that the construction of the desilting works will save the water-users from $1,000,000 to $1,400,000 annually.

From the Imperial Dam, the canal follows the river to Laguna Dam and on down to the International Boundary line along the edge of a bluff, following a very rough profile, due to cutting through ridges and crossing numerous washes, to Siphon Drop where one of the four power plants will be established. At several points in this section where storm waters might endanger the canal, the ditch is carried under the main washes through concrete siphons. Turnouts are to be provided to supply the laterals now taking water from the Yuma main canal, as the desilting operations will interfere with the present diversion of water for the Yuma project at Laguna Dam, and so at Siphon Drop 2,000 second-feet is to be turned out. Between Siphon Drop and Pilot Knob the capacity of water carried will be 13,000 feet. At the latter point another power drop will be found. Here there is approximately 55 feet between the water level in the canal and in the river. Canal capacity is reduced from 13,000 to 10,000 second-feet at the location for the Pilot Knob power plant and a wasteway to the river of 10,000 second-feet capacity is planned at that point. Passing around the south side of Pilot Knob, where there are two deep rock cuts, the line continues in rough ground to the International Boundary where it enters a comparatively level mesa. After crossing this mesa a distance of one and one-half miles, the line passes through a range of sand dunes for a distance of ten and one-half miles. The deepest cut in the sand hills is in the westernmost ridge. Here the cut is 100 feet deep in order to place the canal bottom section in the solid underlying mesa formation and not in dune sand. The total excavation here will be approximately 22,000,000 yards. In some places here, the top width of the canal will exceed 450 feet. Between the sand hills and the east highline canal, there will be four drops in the All-American. The first will be immediately below the turnout for the Coachella canal. The stretch west of Calexico to the west side main where the canal ends is now under construction by force account. Awards for other portions of the work have been made to the W. E. Callahan Construction Company of St. Louis and the Griffith Company of Los Angeles.

Shown above are two of Callahan's Bucyrus-Monighan draglines, a 6-W in the foreground and a 10-W farther back, excavating a section of the canal near Laguna Dam.

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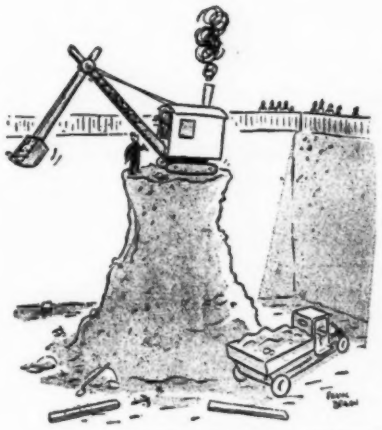
"John I hope I didn't see you smiling at that creature who just passed."

"I hope you didn't, m' dear."

Clerk—I can't help being sleepy in the office: My baby is teething and every five minutes wakes me up.

Boss—If that is so, you had better bring him to the office.



—COURTESY NEW YORK AMERICAN.

"I guess we should have thought of this before!"

Salesman (at motor show): "This is the type of car that pays for itself, sir."

Prospect: "Well, as soon as it has done that, you can have it delivered at my garage."

Doctor (inquiring after boy who has swallowed a half dollar): "How is the boy today?"

Mother: "No change yet."

Conductor (to young lady): "I will have to charge full fare for your little brother, he's wearing long pants."

Young Brother: "Gosh, sis; according to that, you ride free."

An old countryman had been about Vancouver for some time without work, but finally got a job cutting the slabs into stove lengths.

The hazy circle at the outer edge of the circular saw had a tremendous fascination for him and at last he put his finger over it to see just what it was. His finger came off.

As he stood gazing at the bleeding finger stump, the foreman came along. "Well, what's the matter here?" he asked.

"Blime me if I know," was the reply. "You see I just put my finger over the saw like that . . . My gawd there's another one gone!"

Brown arrived home at three a.m. When he reached the front door he found a burglar jimmying it.

"Wait a minute, old man," said Brown. "Let's strike a bargain. I'll open the door if you will go in first."

Comedian: I hear you and the leading lady are on the outs.

Electrician: Yeah, it was one of those quick change scenes with the stage all dark. She asked for her tights and I thought she said "lights."

"Yes," said the old timer, "I have had some terrible disappointments, but none stands out over the years like the one that came to me when I was a boy."

"And what was that?"

"Why—I crawled under a tent to see the circus and found out it was a revival meeting."

Oiler: "Waiter, will you put a sample of this gravy in a small bottle for me?"

Waiter: "What for, sir?"

Oiler: "I want to get a vest to match."

Pathetic Figures: The boy that lisps trying to tell a girl that he likes her size.

A gent, alcoholically oversubscribed, wandered into a movie. During the intermission, while the audience was being bored with announcements of future films, the drunk got to his feet and called out:

"Is there a doctor in the house?"

There was. A man down in the third row stood up, saying:

"I'm a doctor."

The drunk leered amiably. "Hello, doc, how do you like the show?" he said and sat down.

Gas Station Attendant: "How's your oil?"

Negro Motorist: "Ah's fine. How's yo' all?"

Merritt Parkway Construction Embodies Unusual Features

(Continued from Page 76)

● *Where the Byram River was diverted from its original course and relocated parallel to new Merritt Parkway. Stone work of bank at left was done with natural rock without use of cement.*

Byram River Diverted

An interesting feature of the job was the diversion of the Byram River to a new channel parallel to the road so that a bridge could be built at a less expensive location. The slope paving of the new channel of the relocated stream was done with natural rock without the use of any cement or mortar, giving, in this instance, a very attractive appearance to the banks.

A reporter for the Greenwich Daily News-Graphic comments that Claude Z. Jette, Assistant Highway Engineer for the State, appeared to be not so much concerned with construction costs "in six and seven figures, nor with massive machinery and percentages, but that his concern was for beauty.

"'All trees that may be replanted are being saved,' said Mr. Jette to the reporter, 'so that the State's money will not be wasted. One of the Department's main efforts is given to protecting trees and shrubs that can be planted along the parkway later on. We are trying to retain the natural beauty of the countryside.

"'Every foot of the sloping sides of the parkway will be covered with loam and planted. Within a stone's throw of our office on Riversville road there is piled up at least 10,000 yards of loam. You can realize the saving to the State by comparing the cost of forty cents per yard in transporting this loam with the price of six dollars per yard that is customarily paid.'

"The landscape department will place loam, manure, and chemicals in a composite heap to prepare a richly nitrogenous soil for use next spring. The section between the two lanes of the parkway has been enlarged from fifteen to twenty-one feet to permit the planting of trees, which will make the highway different from any other in this locality."

Cutting Roadway Through Forest Creates Over-Supply of Firewood

The right-of-way, a three-hundred-foot strip, was peculiarly inaccessible so far as intersecting roads were concerned and the contractor was forced to widen and grade existing bridle paths and trails through the woods and to provide fords or small bridges over several streams. The parkway passes through what is practically virgin forest and many of the trees cut down were found to have two hundred or more rings and to be, some of them, as much as four feet in diameter. Logging off was done by hand and Peter Mitchell, Inc., was the embarrassed owner of more than a thousand cords of firewood, the disposal of which so glutted the local market that it kicked the bottom out of the cordwood price structure. Wood fires in Greenwich fireplaces will be cheap and popular for the next year or so.

Stumps were sometimes blasted out but more frequently (and less expensively) removed by shovels. Where the tops of stumps would be covered by two and one-half feet of fill, or more, the stumps were left after being cut off to original grade level.

Honey harvesting was one of the side lines undertaken by the men engaged in clearing off the

● *A load of rock on its way to the fill. The 10-yard La Plant-Choate wagon is pulled by a Caterpillar Diesel 50.*

● Top left: Rock-filled approaches lead to the new bridge built by Lee Construction Company of Boston. Top right: Rubble stone-walled trench at toe of cut, showing perforated pipe in bottom of trench and crushed stone trench filling at right foreground. This drainage system protects the sub-grade. Center: Two-truck spotting under the Bucyrus-Erie speeds up excavation in the rock cut. Bottom left: Here is a pile of loam which has been set aside for future use along the Parkway. An inspector from the landscape department is on the watch for topsoil, attractive rocks and trees which will add beauty to the new pleasure drive. Bottom right: Reinforced concrete arch-bridge which carries Merritt Parkway over branch of Byram River and secondary road.

right-of-way, two trees having been found containing large amounts of honey. Fortunately the temperature was low enough so that the bees didn't have the ambition to defend their hoards as the workmen removed the huge masses of honeycomb.

Gasoline and fuel oil are purchased from local distributors for use in shovels, trucks, tractors, etc. About 1,000 gallons of gasoline are consumed per working day. Liquid fuel is distributed to the various machines at their working locations by a three-compartment 402-gallon tank truck, owned and operated by the contractor. A 1,000-gallon gasoline storage tank is located at the job. Three distributors are patronized, each of which supplies the liquid fuel on a take-your-turn basis for one week periods.

All labor is restricted to a 30-hour working limit per week per man. During the summer the men were working in two 6-hour shifts; later the hours were changed to one 10-hour shift, and at the present the job is run on the basis of one 9-hour shift per working day. At the time the job was visited there were some 250 men employed, whose pay was as follows: common laborers, 50c per

(Continued on Page 106)

Add a Few Hundred Feet to the Reach of Your Crane or Dragline

A boom machine can be converted easily into a portable slackline excavator for doing away with rehandling of the dirt on long haul work.

The Sauerman Bulletin No. 140 tells all about this economical idea.

Write for it now.

SAUERMAN BROS., Inc.
474 S. Clinton St., Chicago

WILLIAMS *Multiple-Rope* **Bucket**

DOUBLE HINGE— permits a more rigid construction and **LONGER SPREAD** of open bucket without increasing the headroom.

We also build Power-Arm Clamshell and Dragline Buckets for every purpose. Write for bulletins.

THE WELLMAN ENGINEERING CO.
7002 Central Ave.
CLEVELAND, OHIO

For your convenience in writing to the advertisers on this page, you will find a card bound in this issue.

EXCAVATING ENGINEER Bargain Counter

★ ★ ★ **THE ITEMS LISTED on these pages have been selected because they offer unusual values to the man who is looking for a bargain. Some of this equipment is surplus stock which has never been used, some is rebuilt and carries new equipment guarantee, some is just plain used. But every item is priced for quick sale. If any of this equipment fits your needs send a postcard or letter, mentioning the reference number, to *Bargain Counter, Excavating Engineer, South Milwaukee, Wisconsin.* We'll pass your inquiry along to the owner and you will receive price and complete information promptly. Act now — with advancing prices on new stock this equipment will move fast.**

SHOVELS-CRANES DRAGLINES

P&H MODEL 208—45' BOOM DRAGLINE— Cats—15½' long, 9' wide, 22" Treads. 100 H.P. Waukesha High Alt. Engine. SCD-1.

P&H MODEL 208—45' BOOM DRAGLINE— 4-cylinder 7¾"x9" Twin City gasoline engine and 1½ cu. yd. Omaha bucket. SCD-20.

BUCYRUS-ERIE 30-B DIESEL 40' BOOM DRAGLINE. SCD-21.

MEAD-MORRISON GASOLINE COMBINATION SHOVEL-CLAMSHELL. ½ cu. yd. Dipper, 17' Dipper handle—18' Boom—32' Clamshell Boom and ½ yard Erie Clamshell Bucket. 5"x6" 4-cyl. Wisconsin Engine. Good mechanical condition. Bargain Price. SCD-28.

BAY CITY "PUP" GASOLINE CLAMSHELL. Good mechanical condition. SCD-24.

BYERS "BEARCAT" Gasoline ⅝-yard Shovel. Hercules engine. Overhaul. Good mechanical condition. SCD-25.

THEW-UNIVERSAL MODEL 35 — Gasoline — ½ cubic yard standard shovel equipment—25' lattice type crane boom and ½ yard Williams bucket with teeth—complete drag shovel attachment and skimmer scoop bucket, including home-made trailer. Excellent condition. SCD-26.

BUCYRUS-ERIE MODEL 30-B DIESEL SHOVEL—25'9" Boom, 14' Dipper Handle, 1 yd. Dipper. SCD-9.

Shovel Equipment

¾ CU. YD. DIPPER—20' boom—13' Dipper Handle—rope crowd shovel equipment. Suitable for models 1030 or 1035—brand new. SE-1.

¾ CU. YD. DIPPER—23' BOOM—15' DIPPER HANDLE—Extra High Lift Rope Crowd Shovel Equipment suitable for Models 1030 or 1035. Brand New. SE-2.

¾ YARD PLATE DIPPER, 19'9" BOOM, 18'4" DIPPER HANDLE—Shovel equipment suitable application Bucyrus-Erie B or B-2. Good condition. SE-29.

COMPLETE FRONT END EQUIPMENT

⅝ CU. YD. DIPPER—23' BOOM and ENGINE —12'6" DIPPER HANDLE—Shovel Equipment suitable for 20-B Steam. Brand New. SE-15.

⅝ CU. YD. DIPPER—26' BOOM and ENGINE —17' DIPPER HANDLE — High Lift Shovel Equipment suitable for 30-B Steam. Brand New. SE-16.

⅝ CU. YD. DIPPER—25'9" BOOM—14' DIPPER HANDLE—Shovel Equipment suitable for 30-B Diesel. Brand New. SE-17.

⅞ CU. YD. DIPPER—21'9" BOOM and ENGINE—15' DIPPER HANDLE — High Lift Shovel Equipment. Suitable for 31-B Steam. Brand New. SE-18.

1 CU. YD. DIPPER—20' BOOM—15' DIPPER HANDLE — Rope Crowd Shovel Equipment, suitable for Osgood "Conqueror." Good mechanical condition. Low Price. SE-24.

1 CU. YD. DIPPER—23' BOOM—12'6" Dipper Handle—Rope crowd shovel equipment. Suitable for D-2 machine. Brand new. SE-4

1 CU. YD. DIPPER—24' BOOM—18' DIPPER HANDLE—Slightly used but good conditioned. Suitable for any Bucyrus-Erie GA-2 or GA-3 Machine. SE-25.

1 CU. YD. DIPPER—24' BOOM—16' DIPPER HANDLE—Rebuilt and Guaranteed. Suitable for application Bucyrus-Erie GA2 or GA3 Machines. SE-26

1¼ CU. YD. DIPPER—22'6" BOOM—16' DIPPER HANDLE—Rebuilt and Guaranteed. Suitable for application Bucyrus-Erie GA2 or GA3 Machines. SE-27.

1¼ CU. YD. DIPPER—25' BOOM—17' DIPPER HANDLE—Slightly Used Rope Crowd High Lift Shovel Equipment suitable for Model 37-B. New Machine Guarantee. SE-5.

1½ CU. YD. DIPPER—23'6" BOOM—15' DIPPER HANDLE—Slightly Used Rope Crowd Shovel Equipment suitable for Model 37-B. New Machine Guarantee. SE-6.

1½ CU. YD. DIPPER—27' BOOM—17' DIPPER HANDLE—High Lift Rope Crowd Shovel Equipment suitable only for Bucyrus-Erie 43-B machines. Rebuilt—New Machine Guarantee. SE-23.

Dragline Equipment

35' CHANNEL BOOM, FAIRLEAD AND ROPES, but not including bucket. For use on Model D-2. DL-2.

40' CHANNEL BOOM, FAIRLEAD AND ROPES, but not including bucket. For use on Model D-2. DL-3.

40' CHANNEL BOOM, FAIRLEAD AND ROPES, but not including bucket. For Model E-2. Brand New. DL-6.

45' CHANNEL BOOM, FAIRLEAD AND ROPES, but not including bucket. For Model E-2. Brand New. DL-7.

40' CHANNEL BOOM, FAIRLEAD AND ROPES, but not including bucket. For use on 30-B Diesel. Brand New. DL-8.

45' CHANNEL BOOM, FAIRLEAD AND ROPES, but not including bucket. For Model 30-B Diesel. Brand New. DL-9.

BRAND NEW Ropes included with each of above Dragline Equipments.

All of above equipment is BRAND NEW and of BUCYRUS-ERIE manufacture.

Skimmer Scoop

⅝ CU. YD. DIPPER—20' Boom together with all necessary ropes and material to completely convert Bucyrus-Erie 1020 Shovel, Clamshell or Dragline to Skimmer Scoop Machine. Brand New. Shipment 2 to 3 weeks. SS-1.

Trench Digging Equipment

1 CU. YD. 42½" WIDE—Solid type Dipper—24' Boom and all auxiliary equipment. Will dig maximum depth 22'. For application to GA-2 or GA-3 Shovel. Rebuilt—New Machine Guarantee. DS-5.

BRAND NEW PAGE, two dippers each ¾ cu. yd., one 38" wide over cutters, the other 49½" wide over cutters. 17'1½" Boom and all necessary auxiliary equipment. Will fit Bucyrus-Erie 1030 or 1035. DS-7.

1-CU. YD. 42½" WIDE SOLID TYPE DIPPER —24' Boom and all auxiliary equipment—will dig maximum depth of 22'—For application to GA-2 or GA-3 Clam Shell or Drag Line. Rebuilt —New Machine Guarantee. DS-8.

BRAND NEW Ropes included with each of above Trench Digging Equipments.

Address all inquiries to Bargain Counter, Excavating Engineer, South Milwaukee, Wisconsin.

DIPPERS

Small Machines

2 ⅝ CU. YD.—Plate.—Will fit 20-B Steam or Gas. Brand New. D-12

1 2/3 CU. YD.—Plate front.—Will fit 14-B. Brand New. D-13

1 ¾ CU. YD.—Rock Type.—Will fit 20-B Steam or Gas. Brand New. D-15

3 ⅞ CU. YD.—Plate front.—Will fit 1030 or 1035. Brand New. D-16

2 ⅞ CU. YD. Plate front.—Will fit 1030 or 1035. Brand New. D-18

1 ⅞ CU. YD. CAST FRONT INSERTED TOOTH DIPPER. Will fit 1030 or 1035. Slightly used. D-36

1 ⅞ CU. YD. CAST FRONT INSERTED TOOTH DIPPER. Will fit 1030 or 1035. Brand New. D-37

1 ⅞ CU. YD.—Plate front.—Will fit 18-B. Brand New. D-20

1 ⅞ CU. YD.—Rock type. Will fit 31-B. Brand New. D-21

1 CUBIC YARD MANGANESE DIPPER. Will fit Bucyrus-Erie B-2 or GA-2. Good condition. D-40

2 1 CU. YD.—Cast Front Inserted Tooth Dippers. Rebuilt and Guaranteed. Suitable for application GA2 or GA3 Machines. D-34

1 1¼ CU. YD.—VAN PORT—ROCK TYPE. Will fit E-2, 41-B or 42-B. Slightly Used. D-26

2 1¼ CU. YD.—VAN PORT—ROCK TYPE. Will fit E-2. Brand New. D-27

1 1¼ CU. YD. CAST FRONT INSERTED TOOTH DIPPER. Will fit 37-B. Slightly used. D-38

1 1½ CU. YD.—PLATE. Will fit E-2. Brand New. D-28

1 1½ CU. YD. CAST FRONT INSERTED TOOTH DIPPER. Will fit 43-B. Slightly used. D-39

2 1½ CU. YD.—Manganese Front Inserted Tooth. Will fit E-2, 41-B or 42-B. Slightly used. D-29

1 1½ CU. YD.—Vanderhoef type with Vanderhoef teeth. Will fit E-2 or 42-B. Slightly Used. D-30

Large Machines

1 2½ CU. YD.—Front 2½" Molybdenum Cast Steel, two part Van Port Reversible Teeth. Can be used on 68-C and 70-C machines. Brand New. D-1.

2 3 CU. YD.—Front 2½" Molybdenum Cast Steel, two part Van Port Reversible Teeth. Can be used on Model 100-B, 68-C, 70-C Machines. Brand New. D-2.

1 3½ CU. YD.—Front 2¾" Nickel Chrome Steel, two part Van Port Reversible Teeth. Can be used on Model 88-C, 95-C, Class 180. Brand New. D-3.

1 4 CU. YD.—Front 2¾" Molybdenum Cast Steel, two part Van Port Reversible Teeth. Has seen some service but in good condition. Can be used on Model 100-C, 120-B. D-4.

1 4½ CU. YD.—Lip 2¼" Manganese Steel, two part Reversible Manganese Teeth. Can be used on Model 88-C, 110-C. Brand New. D-5.

3 6 CU. YD. Molybdenum Steel Front. Annealed Cast Steel Back, two part Reversible Van Port Teeth. Can be used on 225-B and 320-B. Brand New. D-11.

1 8 CU. YD.—Front Molybdenum Steel, two part Van Port Reversible Teeth. Can be used on Model 320-B. Slightly Used but excellent condition. D-6.

DRAGLINE BUCKETS

BRAND NEW

2 ¾ CU. YD. PAGE CLASS "C." Approximate weight each 2425 lbs. DB-1

1 1¼ CU. YD. BUCYRUS-ERIE TYPE "U". Approximate weight 2900 pounds. DB-15

3 2 CU. YD. PAGE CLASS "C." Approximate weight each 5630 lbs. DB-4.

1 2¼ CU. YD. BUCYRUS-ERIE TYPE "U". Approximate weight 3850 lbs. DB-13.

1 2½ CU. YD. BUCYRUS-ERIE TYPE "U". Approximate weight 4600 lbs. DB-14.

REBUILT

1 2 CU. YD. BUCYRUS-ERIE TYPE "U". Approximate weight 3200 lbs. DB-12.

1 2½ CU. YD. BUCYRUS-ERIE INSERTED TOOTH. Approximate weight 6500 lbs. DB-9.

1 2½ CU. YD. OMAHA STANDARD. Approximate weight 5400 lbs. DB-10.

USED

1 1 CU. YD. PAGE BUCKET. DB-20.

BOILERS

BRAND NEW

Will Make That Old Shovel Work Like New.

Can also be used for Miscellaneous Service

Vertical Type

1 44½"x88½"—37 H.P.—145 lb. Working Pressure—Canadian Standard. Will fit B or B-2. B-4.

1 46½"x88½"—37 H.P. 150 lb. Working Pressure. Massachusetts Standard. Will fit any B-2 or B-3 Machine. B-7.

3 46½"x110"—40 H.P.—155 lb. Working Pressure. Special Wood Burning Fire Box. ASME Std. Will fit any B-2 or B-3. B-9.

1 54"x100"—41 H.P.—125 lb. Working Pressure. ASME Std. Will fit B-2 or B-3. B-11.

1 58"x7'9"—70 H.P.—150 lb. Working Pressure. Mass. Std. Will fit 42-B Machine. B-12.

Locomotive Type

3 44"x17'—75 H.P.—125 lb. Working Pressure. ASME Std. Will fit Model 66-C. B-13.

1 44"x18'—88 H.P.—125 lb. Working Pressure. ASME Std. Will fit Model 70-C. B-14.

2 54"x11'3"—92 H.P.—125 lb. Working Pressure. ASME and Mass. Std. Will fit Model 50-B Machine. B-16.

ELECTRICAL EQUIPMENT

MOTOR—GENERAL ELECTRIC—3 phase, 25 cycle, 550 volt, 1500 RPM., 90 HP., BRAND NEW. EE-1.

50 KW MOTOR GENERATOR SET—GENERAL ELECTRIC—consisting of 3 phase, 60 cycle, 440 volt, 1170 RPM., 75 HP., Induction Motor connected to 50 KW, 250 volt, 1200 RPM., Generator, including suitable rheostat and compensator. BRAND NEW. EE-2.

COMPENSATOR — GENERAL ELECTRIC—75 H.P., 2220 volt, 3 phase, 25 cycle, manual type. BRAND NEW. EE-3.

TRANSFORMER—GENERAL ELECTRIC—5-KVA, 2200-3810 volt primary, 440-220 volt secondary—3 phase, 60 cycle, with cast iron tank and cover, including specially fastened bushings to prevent oil leakage. BRAND NEW. EE-4.

GENERATOR — WESTINGHOUSE — 125 KW, 250 volts, 500 amperes. Direct Current. 440 RPM. Includes two outboard bearings. BRAND NEW. EE-5.

MOTORS (2) — GENERAL ELECTRIC — 21.5 H.P. 3 phase, 60 cycles, 440 volt, 900 RPM. Totally enclosed—ball bearing. BRAND NEW. EE-6.

AIR COMPRESSORS

1 BRAND NEW WORTHINGTON—METAL-WELD—2-cylinder 7"x6" Vertical 162 cu. ft. piston displacement, Air Compressor. Fitted with Laidlaw feather valves—Lugs on side for mounting on skids or channels—Shaft extended and equipped with semi-flexible coupling to take 2⅝" drive shaft—Force feed lubrication. Automatic control. Includes 1" High capacity centrifugal circulating pump—"V" belt driven—18"x41" Air Receiver, 100 pounds working pressure. A.S.M.E. Standard. Electric or gasoline power required approximately 30 H.P., approximately 1000 R.P.M.—Compressor Speed approximately 550 R.P.M. — Overall dimensions:—Height 45"—Length 37½"—with 28". AC-3.

2 11"x11"x12" STEAM DRIVEN LOCOMOTIVE TYPE, Westinghouse air compressors with fittings. Brand New. AC-1.

1 11"x11"x12" STEAM DRIVEN LOCOMOTIVE TYPE, Westinghouse air compressors with fittings. Used. Make offer. AC-2.

ROAD ROLLERS

1 10-TON BUFFALO SPRINGFIELD GASOLINE ROLLER with scarifier. About three years old. Splendid condition. Very favorable price. RR-1.

ENGINES

Designed especially for application to Excavating or similar Equipment. Can be used for stationary or semi-stationary service.

Diesel

2 BRAND NEW NON-REVERSIBLE ATLAS DIESEL ENGINES—5-cylinder, 9" bore x 10½" stroke, 150 H.P. at 450 R.P.M., 4 cycle, Vertical—valve in head type. Dust proof, Oil tight crank case and forced lubricating system. Also auxiliary air starting equipment. DE-2.

1 BRAND NEW NON-REVERSIBLE ATLAS DIESEL ENGINE—4-cylinder, 6" bore x 8" stroke, 45 H.P. at 650 R.P.M., 4-cycle, Vertical—valve-in-head type. DE-5.

Gasoline

1 MODEL HH-U NOVO—16 H.P. ENGINE—4-cylinder, 3⅝" x 4"—1200 R.P.M.—Radiator cooled—complete power plant—mounted on channels—sheet metal housing—extended crank shaft 1⅞" diameter, including outboard bearing with Fafner ball bearing. GE-1.

Steam

1 12½"x16" link reversing type for Railroad Shovel. ME-1.

2 4½"x5" reversible—20.8 H.P. at 400 R.P.M. 100 lb. Pressure. ME-2.

1 4¾"x5" reversible—23.2 H.P. at 400 R.P.M. 100 lb. Pressure. ME-3.

2 5"x5" reversible—25.6 H.P. at 400 R.P.M. 100 lb. Pressure. ME-4.

LOCOMOTIVES

3 24-INCH GAUGE 3-TON BALDWIN GASOLINE LOCOMOTIVES, Model AL, Type 2. Price very favorable. L-1.

TRAILERS

1-14 TON WILLIAMS "ECONOMY" TRAILER. Arch Girder Construction—Safety Chains—Rear Loading ramp. Solid Rubber tired wheels 28"x10" front 28"x16" rear. Deck dimensions 12'x7'9"x31½" high. Brand new. T-1.

PUMPS

1 NB — 3 STAGE CENTRIFUGAL PUMP — 2" suction and discharge — bronze impeller and shaft—capacity 100 gallons per minute at 240' head operating at 1720 RPM or 270' head at 1780 RPM. Now equipped for belt drive but can be operated by 15 HP Electric Motor. ME-6.

Merritt Parkway Construction Embodies Unusual Features

(Continued from Page 103)

● *The operator of this Bucyrus-Erie 1½-yard shovel apologized because he was digging loose overburden. He says "we generally use these shovels to load the big rocks."*

hour; truck drivers, 60c per hour; rough carpenters, 85c per hour; finish carpenters, $1.20 per hour; shovel operators, $1.20 per hour; common mechanics, $36.00 per week; and master mechanics, $40.00 per week.

Approximately 25% of the equipment used on this job is rented, but Peter Mitchell, Inc., is reported to have purchased in excess of $100,000 worth of new equipment, including three Bucyrus-Erie 1½-yard shovels, Caterpillar Diesels and La Plant-Choate wagons and bulldozers.

Three utility trucks, two Chevrolets and a Ford, all equipped with pick-up bodies, are used for general light hauling.

A gravel bank was purchased by the contractor for use in some of the gravel fill, as the right-of-way did not pass through cuts containing satisfactory gravel for this purpose.

Drainage System Protects Sub-Grade

The drainage system has been carefully designed to prevent erosion of the sub-grade. Bituminous covered, corrugated, perforated iron pipe is buried parallel to the parkway in trenches about three feet deep at the toes of each cut. These trenches have sidewalls of dry rubble stone and the perforated pipes, laid at the bottom, are covered with crushed stone which fills the trench to the top. In some cases lateral feeders extend in the same manner from beneath the center of the future paving and the perforated pipes in these lateral feeders are connected with Y's to the pipes at the toes of the cuts. Connecticut high-test concrete drain pipes are used for all small culvert work and for leading storm water to and from brick settling and catch basins.

Surveying by the State is going on all the time, there being a party composed of a chief, an instrument man, a rodman and a chainman, on the job every day. Surveying for the contractor is under the supervision of Arthur A. Mitchell, chief engineer for Peter Mitchell, Inc.

Aside from the loss of a finger by one of the men, there have been no personal injuries worth mentioning during the progress of the work; and no property damage aside from the slight roof repairs previously referred to.

Shovels are hauled on public highways on a Rogers Bros. trailer, Type 6GNL, with an estimated capacity of some forty tons. On level ground one 5-ton Mack truck is all that is necessary for pulling, but on steep hills or soft road surfaces it is sometimes necessary to use as many as three 5-ton Macks, one pulling and two pushing.

● *Left: Theodore M. Mitchell, Assistant Superintendent for Peter Mitchell, Inc. Right: Claude Z. Jette, Assistant Highway Engineer for the State Highway Department.*

● *A general view of the Merritt Parkway showing one of the Northwest shovels at work in a shallow cut. The tank truck is busy delivering gasoline and fuel oil to the trucks and shovels. The arch-bridge in the middle distance crosses a small branch of the Byram River and a secondary road.*

PWA Funds Help to Finance Project

The official name of this section of the Merritt Parkway is, in case you are interested, Federal Emergency Administration Public Works Project P.W.S. Docket No. 5186-2. The work is being conducted by the Connecticut State Highway Department, although it is directed to some extent by the United States Bureau of Public Roads, since the parkway is constructed not only with an appropriation by the Connecticut General Assembly, but also with the aid of PWA funds.

The Merritt Parkway was designed under the supervision of A. W. Bushell, Engineer of Contracts and Construction, Connecticut State Highway Department. D. J. Linehan, Resident Engineer of Construction, New Haven Division, is assisted in highway construction by Mr. Jette, and in bridge construction by Leo J. Conaty, Assistant Highway Engineer. J. Brandriff, timekeeper for the Highway Department, gets a special vote of thanks for his patience with, and courtesy to the writer.

The firm of Peter Mitchell, Inc., was founded in Greenwich, Connecticut, in 1882. Albert E. Mitchell is president and treasurer; E. T. Mitchell is vice president and secretary; Joseph Kelly and Theodore M. Mitchell are, respectively, superintendent and assistant superintendent in charge of construction.

The prim old lady was dining one evening and while the waiter was standing by the table she asked him to find out the title of the piece the orchestra was playing. Other duties claimed the waiter for a time and when he returned the lady had completely forgotten her request. Imagine her confusion when he bent toward her and softly whispered, "What can I do to make you love me?"

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FOR VOLUME XXVIII
January to December, 1934, inclusive
NOW READY
SENT FREE ON REQUEST
EXCAVATING ENGINEER
South Milwaukee, Wisconsin

POSITIONS WANTED

Positions wanted advertisements will be run under this heading for 5 cents per word, minimum charge $1.00. Advertisements for help wanted free of charge.

Address all box numbers c/o Excavating Engineer at South Milwaukee, Wisconsin

OPERATOR

Thirty years experience on coal stripping, railroad and highway construction. Prefer coal stripping anywhere. Can do own repair work and furnish best of references. Married. Present location, Pennsylvania. Box 6501.

OPERATOR

23 years' experience on practically all makes of shovels, Draglines, Clamshell and Cranes, using steam, electric, gasoline or Diesel power. Single and willing to go anywhere in U. S. or foreign countries. Can do own repair work and furnish A-1 references. Present location, Wisconsin. Box 6900.

EXPERT DRAGLINE AND SHOVEL OPERATOR

16 years' experience as shovel operator. Married, 36 years of age. Have operated practically all makes of machines, and have 10 years' experience as dragline operator. Can handle steam, Diesel, electric or gasoline machine. Have worked on highway and railroad grading, rock excavation in quarry, drainage and irrigation and dredging and also gold dredging. Prefer position on Bucyrus-Erie E-2, D-2, or 50-B or other Bucyrus-Erie machines. Have also operated Class 220 and 225 electric and Diesel electric machines. Capable of taking charge of repairing and erecting and can handle crews. Best of references and can do own repairing. At present located in California, but will go anywhere. Box 5507.

SHOVEL-DRAGLINE OPERATOR

Experienced on gas, steam, and Diesel equipment. Desires employment of any kind, anywhere; prefers foreign. Box 7100.

OPERATOR—PIT FOREMAN—DRILL FOREMAN

14 years' experience as shovel operator and pit foreman on coal stripping, railroad grading, highway grading, quarry and gravel pit work. Drill foreman on blast hole, tripper rod and air drills. Can operate oxy-acetylene cutting and welding torch. Can do own repair work. Age 41. Can furnish good references. Willing to go anywhere in U. S. A. Now located in Tennessee. Box 7101.

EXPERIENCED DRAGLINE OPERATOR

Fifteen years' experience on Bucyrus-Monighan, P&H, Northwest and other makes of Steam, Diesel, gas and electric draglines on levee work and phosphate mines. Hold three sets civil service papers with ratings of 70%, 85%, and 100%. Married but can go anywhere. Furnish excellent references. Present location, Louisiana. Box 5908.

OPERATOR

15 years experience on gasoline, steam and electric machines. Bucyrus-Erie, Thew and Northwest machines. Prefer operating Bucyrus-Erie. Have worked on highway and railroad grading, quarry, excavation. Willing to go anywhere in U. S. A. Can do all repairing and furnish excellent references. Box 7001.

STEAM SHOVEL OPERATOR

14 years experience on Steam shovels and draglines, on highway construction, rock, quarry, gravel pit, also five years as shovel foreman in coal stripping. Can do own repair work on any type steam machine and willing to go anywhere in U.S.A. Present location, Tennessee. Box 7000.

GAS OR STEAM SHOVEL OPERATOR

7 years' experience on cutting slopes, gradings and highway construction, not afraid of work. Would like a position on any type of small machine anywhere in the U.S.A. Can do his own repair work and furnish good references. Box 6506.

STEAM SHOVEL OPERATOR

14 years experience with steam machines only on Railroad and Highway grading, coal stripping, Rock Quarry and Gravel Pits. Can do own repair work, furnish references and willing to go anywhere. Present location, Tennessee. Box 6700.

Jetty Builders Save Town

(Continued from Page 80)

● *The Koehring 8-ton crane is mounted on a flat car, and works at the outer end of the jetty.*

road track over which stone is moved to the jetty. These bents, on 8-foot centers, with 4 piles in each, constituted a real job in themselves. The 10 to 12-inch diameter piles were placed by jetting. A stream of water piped under high pressure washed away the sand beneath the pile, which was held in place by a Universal Truck-crane. When the pile had descended far enough in the sand, a drop hammer suspended from the crane hook was used to tap it securely in place. Construction of the mile-long trestle required a bit over two months. When the jetty is completed the trestle will be removed. The trestle line has been laid out just seaward of the line established for the jetty, except at its outer end where, because the bottom width of the jetty increases in deeper water, the trestle is laid along its center line, so that the cranes in placing the stone will not be required to operate at a radius beyond their capacity.

Air-Operated Swing on Gas+Air Has Advantage

The Koehring crane, operated by Tom Randolph at the outer end of the jetty, is able to handle a larger tonnage of stone, because less care is required in placing the core. Theodore Maxon on the Bucyrus-Erie crane has to place each huge cap stone exactly in place. He says that for this work the air-operated swing on the Gas+Air crane is a wonderful feature, as he can spot each stone exactly, without jerking. Each of the huge slabs of stone must be placed close alongside of the next. The theory is that by finishing the jetty with a smooth profile there will be less tendency for the rock to be displaced by the battering of the waves.

On the first jetty the 10-ton Bucyrus-Erie Rock Grab was used for placing cap stone. There was a considerable saving in time not only in picking up the stone off the car, but also in releasing it. When chains are used the crane operator must swing the boom from side to side to release the hook, and then carefully pull the chain from beneath the rock so as not to displace it. The Bucyrus-Erie Rock Grab has proved indispensable in salvaging stone which has rolled beyond the jetty profile.

● *An interesting feature of the Bucyrus-Erie Rock Grab is that the heavier the stone, the greater the holding force exerted by the Grab.*

The members of the Howland organization are enthusiastic about the device because of its speed and safety. "Red" Howland says he expects to use it on a job requiring 1 to 5-ton stone, where exact close placement is not required. He believes he can more than double the stone placed as compared with less modern methods.

Jetties Cause Beach to be Formed

Construction of the second jetty was started at its inner end. At that time only open water surrounded it. But in the six weeks which have elapsed since placing the first stone, sand has been washed in by the waves in back of the newly built jetty for more than 150 feet. It is anticipated that a beach curving out to the far end of the jetty will eventually be formed. The action of the waves at this point appears to move the sand generally in a northerly direction. So it is predicted that finally all the sand washed away (except, of course, that between the two jetties) will not only be replaced but added to. Thus a fine beach will replace what now is open water.

The steady movement of carload after carload of stone out over the trestle, and the steady progress in placing this stone in its final location in the jetty makes the job look deceivingly simple. But one has only to stand on the sturdy trestle and feel it give and sway as waves crash against it to realize that the work is moving smoothly forward in spite of difficulties. The fact that such good progress is being made is a tribute to the ability of the contractor, gained by years of experience in construction work under these trying conditions.

"How do you know it was a stork and not an angel that brought your little brother?"

"Well, I heard daddy complaining about the size of the bill, and angels don't have bills!"

FOR SALE

RATES:	First insertion rate per column inch	Repeat insertions (no change in copy) rate per column inch
Up to 3 inches	$4.50	$4.00
Over 3 and up to 7 inches	4.25	3.75
Over 7 inches	4.00	3.50

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Address all box numbers c/o Excavating Engineer at South Milwaukee, Wisconsin

Small Shovels
Under 2 Yards

ONE 18-B BUCYRUS-ERIE, ⅞-yard dipper on full revolving caterpillars. Box 182-SS.

BUCYRUS ERIE So. Milwaukee, Wis.

OFFERS FOR SALE OR RENT
FACTORY REBUILT and USED SHOVELS--CRANES--DRAGLINES

Please send me full details on:

- ☐ Monighan Dragline 60-foot boom. Priced right.
- ☐ Thew Model 35, ½ yd. Sh. Crane, S. Scoop & Trench Digger.
- ☐ Northwest 45' Boom Clamshell — 1 yd. capacity.
- ☐ Mead - Morrison Gasoline Combination Shovel-Clamshell. Good condition.
- ☐ P&H Model 207—40' Boom Dragline. Reconditioned.
- ☐ Bucyrus-Erie GA-2 Shovel. Rebuilt. New Machine Guarantee.

Name.....

Address.....

THEW-LORAIN 75-A. 1¼ CU. YD. GASOLINE SHOVEL. Fair condition. Very favorable price. Located North Carolina. Box 553-SS.

BYERS BEAR CAT—⅝ yd. Gasoline Shovel— Recently overhauled — Located Birmingham, Alabama. Box 480-SS.

P & H MODEL 600—1 yd. Gasoline Shovel— Waukesha Engine. Recently overhauled. Located in Alabama. Box 483-SS.

BUCYRUS-ERIE GA-2 SHOVEL—24' BOOM, 16' DIPPER HANDLE, 1¼ CU. YD. DIPPER, Battery Lighting System. Late style Cat mounting. Excellent condition. Located West Virginia. Favorable price. Box 541-SS.

BYERS MODEL 40—⅝ cu. yd. Cable Crowd Shovel, Outside Dipper Handle, Plate Dipper. ¾ swing. Including Back Hoe Attachment. Hercules 4-cylinder Gasoline Engine. Cat mounted—12" treads. Located eastern Pennsylvania. Box 554-SS.

BUCYRUS-ERIE—42-B Steam Shovel, Caterpillar Mounted, 21' Boom, 15' Dipper Handle, 1½ Cubic Yard Dipper, Power Boom Hoist. This machine excellent mechanical condition. Located Birmingham, Alabama. Can be demonstrated. 531-SS.

If You Do Not Find What You Want Listed—Write Us
The Excavating Engineer
South Milwaukee, Wis.

REBUILT GA-2 SHOVEL NO. 10817, single shaft cat mtd., 24' boom, 16' dipper handle, 1¼ cubic-yard cast front inserted tooth dipper, electric starter, Waukesha 4 cylinder 6¼"x8" Gasoline Engine, steel cab. New machine guarantee. Box 567-SS.

GA-2 SHOVEL, BUCYRUS-ERIE NO. 9918, 22' Boom, 16' Dipper handle, 1 cu. yd. manganese steel front inserted tooth dipper, 20-10 Gas Air single shaft drive, caterpillar mounted, 6¼x8", 4 cyl. Waukesha Motor. Weight 71,900 lbs. Reconditioned. Located Greensboro, N. C. Price $5000.00. Box 595-SS.

NORTHWEST MODEL 105 SHOVEL. Bargain Price. Located Texas. Box No. 566-SS.

THEW-LORAIN 75-B 1¼ CU. YD. gasoline shovel. AA-1 condition. Located Texas. Box No. 565-SS.

MEAD-MORRISON COMBINATION SHOVEL-CLAMSHELL—½ cu. yd. Dipper, 17' Dipper Handle, 18' Boom—32' Boom Clamshell Equipment and ½ cu. yd. Erie Clamshell Bucket, Wisconsin 4-cyl. 5"x6" Gasoline Engine. Good operating condition. Located near Buffalo, New York. Box 527-SS.

BUCYRUS-ERIE GAS-AIR TYPE GA-2 HIGH LIFT SHOVEL — 22'6" boom — 16' dipper handle—1¼ yard cast front inserted tooth dipper—single shaft caterpillar mounting—electric starter. Excellent condition. Field reconditioned. Waukesha 4-cylinder 6¼"x8" engine—New cylinder blocks and piston rings. Located near Scranton, Pennsylvania. Will demonstrate. Box 508-SS.

Marion Type 32 Steam Shovel, Shop No. 5676, 18' boom, 15' dipper handle, 1¼-cu. yd. dipper shipped May, 1926, good operating condition. Box 451-SS.

BUCYRUS-ERIE 43-B GASOLINE CHAIN CROWD SHOVEL — 28' boom — 17' dipper handle—1½ cubic yard Vanderhoef dipper and teeth—electric starter—standard single shaft cat. Operated less than six months. Excellent appearance and condition. Will be demonstrated by owner. Located vicinity New York. No. 512-SS.

LIMA MODEL 101—Combination 1¼ yard shovel and 40' plus 10' extension Dragline—powered with gasoline engine Model JK 6½" x7"—4 cylinder. Shovel equipment practically new. Will rent. Located Colorado on C.R.I.&P. Box 599-SS.

NORTHWEST NO. 4—24' Boom, 16' Dipper Handle, 1 yard Dipper—Gasoline—Located eastern New York. Good condition. Box 600-SS.

BUCYRUS-ERIE GA-2—Gas-Air Combination High Lift Shovel and 50' Boom Dragline Equipment, mounted on Single Shaft Cat. Good operating condition. Located near Baton Rouge, Louisiana. 537-SS.

BUCYRUS-ERIE B-2—Late Model High Lift, Single Shaft Cat Mounted, Steam Shovel. Excellent condition. Located vicinity Boston. To be demonstrated. 538-SS.

2 BUCYRUS-ERIE—GA-2—Combination—45' Boom Clamshell—Crane machine and Extra High Lift Shovel equipment. Cat mounted—Self starter—All field rebuilt last year—Excellent condition—Located Eastern Pa. Box 485-SS.

BUCYRUS-ERIE GAS+AIR—22' Boom, 16' Dipper Handle, 1¼ cubic yard Dipper, Waukesha 6¼"x8" four cylinder gasoline engine. Single Shaft Cat mounted. First class condition. Located eastern New York. Box 601-SS.

P&H MODEL 207—40' Boom Dragline—Buda Gas Engine. Field reconditioned. Box 433-SS.

Type "B" Caterpillar mounted, equipped with 19'6" boom, 16' dipper stick and ¾ yard dipper, in good working order. Located near Hudson, Pennsylvania. Price $1750.00. Box 493-SS.

BUCYRUS-ERIE 41-B STEAM SHOVEL—1¼ cubic yard dipper capacity. A.S.M.E. boiler. Used comparatively little. Price very favorable. Located central New York State. Box 597-SS.

BUCYRUS-ERIE D-2—1 cubic yard Caterpillar mounted—Atlas Diesel Engine. Located western Pennsylvania. Box 596-SS.

Drag Shovel

Thew—Universal—Model 35—½-cu. yd. drag shovel complete. Center drive cat. Electric starter. 4 cylinder Waukesha 4½" x 6¼" gasoline engine. Also complete ½-yd. shovel equipment and 25' boom clamshell—crane equipment and bucket together with home-made trailer. Box 468-SS.

1 BUCYRUS-ERIE B-2 Steam ⅞ yard High Lift Shovel—Cat Mounted. Good operating condition. Located near Boston. Make offer. Box 521-SS.

BRAND NEW PAGE DRAG SHOVEL EQUIPMENT suitable for application to Bucyrus-Erie 1030, 1035, or 32-B machines now in the field, consisting of 17-foot 1½-inch boom, 11-foot dipper handle, and two ¾ cubic-yard dippers; one 38-inches wide over cutters—the other 49½-inches wide over cutters, together with auxiliary A frame and ropes. Priced below cost. Box 381-SS.

BUCYRUS-ERIE MODEL 1025 GASOLINE COMBINATION ⅝-YARD SHOVEL — 35' Clamshell, including ¾-yard Williams Clamshell Bucket. Located near Oshkosh, Wisconsin. Good condition. Box No.504-SS.

HEAVY DUTY OSGOOD SHOVEL, Shop No. between 1600 and 1700, located near Scranton, Pa., equipped with a 1½ cubic yard dipper, in good operating condition. Price $3000.00. Boiler inspected January 1st, 1934. Box 473-SS.

BUCYRUS-ERIE LATE MODEL B-2 STEAM HIGH LIFT SHOVEL. 1 yard dipper—single shaft cat mounting. Good condition. Located near St. Louis. Box 518-SS.

BUCYRUS-ERIE 41-B STEAM SHOVEL; 21' boom, 15' dipper handle, boom hoist, dipper trip, 1¼ cu. yd. Vanderhoef dipper, cat mounting, now located and can be demonstrated at Colchester, Conn. Very favorable price. Box No. 532-SS

BUCYRUS-ERIE 42-B STEAM SHOVEL—late model. 21' boom, 15' dipper handle, 1½ cu. yd. Vanderhoef dipper, boom hoist, dipper trip. Massachusetts standard boiler, cat mounting. Good operating condition. Now located and can be demonstrated at Colchester, Conn. Box No. 533-SS

MARION MODEL 450—1¼ Cu. Yd. Steam Shovel, Cat Mounted. New Gears on Caterpillar recently installed. Price favorable. 536-SS.

BUCYRUS-ERIE MODEL 1035—Gasoline, Chain Crowd Shovel, Single Shaft Cat, 26" Treads, Electric Starter, ⅝ Cu. Yd. Dipper. Now operating. Can be demonstrated. Located Massachusetts. 535-SS.

BUCYRUS-ERIE TYPE B STEAM COMBINATION SHOVEL-CLAMSHELL AND STEAM HOE. Machine completely rebuilt 1929. Good operating condition. Located near Boston. Box 517-SS.

BAY CITY MODEL K GASOLINE SHOVEL —17' Boom, 11' Dipper Handle, ½ cubic yard Dipper, 50 HP Hercules Gasoline Engine. Machine rebuilt in 1932 and equipped with positive "Snap In" type propelling clutches and other features of Model K-2 type. Located central New York. Priced for quick sale. Box 513-SS.

NORTHWEST MODEL 6—1½-YARD SHOVEL Twin City 4-cylinder 7¼"x9" engine. Close Crowd. New 1931. Located near Philadelphia. Box No. 503-SS.

FOR SALE

Address all box numbers c/o Excavating Engineer at South Milwaukee, Wisconsin

Small Shovels
Under 2 Yards
Continued

GENERAL ½ cubic yard Gasoline Shovel—including 30′ Boom Clamshell and Dragline Equipment—New 1931—powered with Buda DW6 High Altitude Gasoline Engine. Excellent condition. Located near Denver. Box 588-SS.

BUCYRUS-ERIE Gas-Air — GA-3 High Lift Shovel—1¼ cu. yd.—Single Shaft Cat Mounted. 120 H.P. Waukesha Engine with high compression head. Machine excellent mechanical condition. Guaranteed by owner. Located Montana. 589-SS.

BYERS MASTER SHOVEL — 26′ Boom, 17′ Dipper Handle, 1¼ cu. yd. Dipper, New January 1931. Good working condition. Located Meivern, Kansas—Highway 75 south of Topeka. Price very favorable. 591-SS.

BUCYRUS-ERIE GA-2 Gas-Air Extra High Lift Shovel—24′ Boom, 18′4″ Dipper Handle, 1¼ cu. yd. Dipper, Single Shaft Cat. Electric Starter. Excellent condition. Located eastern Pennsylvania. 592-SS.

THEW "00" ⅝ cu. yd. Shovel. Center drive cat. Wood cab armored. Full revolving 4-cylinder Waukesha Gasoline Engine. Recently overhauled. Located eastern Pennsylvania. 585-SS.

BUCYRUS ERIE GA-2 Gas-Air High Lift Shovel—24′ Boom, 16′ Dipper Handle, 1¼ cu. yd. Dipper, Single Shaft Cat, Electric Starter. Waukesha 4-cylinder 6¼″x8″ Gasoline Engine. Reported excellent condition. Located West Virginia. 593-SS.

BUCYRUS-ERIE 1030 GAS, ROPE CROWD SHOVEL. Good operating condition. Located eastern Minnesota. Available for demonstration. Price right for quick sale. Box No. 490-SS.

BUCYRUS-ERIE 35-B ELECTRIC 24′ BOOM, 16′ Dipper Handle, ½ cu. yd. Dipper, 3 phase, 25 cycle, 440 volt, Cat mounted. Box 544-SS.

BAY CITY ½ CU. YD. GASOLINE CAT MOUNTED SHOVEL. Good condition. Located Massachusetts. Low price. Box 550-SS.

NORTHWEST MODEL 6—1½ CU. YD. SHOVEL—22′ Boom, 19′ Dipper Handle, Caterpillar Diesel Model D-11000 6-cyl. Engine. Rebuilt early this year. Excellent condition. Located eastern Pennsylvania. Box 547-SS.

BUCYRUS-ERIE 41-B STEAM SHOVEL—21′ Boom, 15′ Dipper Handle, 1¼ cu. yd. Dipper, Power Boom Hoist, Cat mounted. Located New York City. Box 545-SS.

KOEHRING MODEL 501 SHOVEL—24′ Boom, 16′ Dipper Handle, 1¼ cu. yd. Dipper, Cable Crowd. 4-cyl. Wisconsin Gasoline Engine. Electric Starter. Automatic Trip. Chain Drive Cat. Excellent condition. Located near New York City. Box 552-SS.

TWO (2) MODEL 301 STANDARD KOEHRING MACHINES, good operating condition. Now operating and can be inspected in southwestern Ohio. Price, $3,000.00 each. Box 540-SS.

AUSTIN BADGER TRACTOR SHOVEL—McCormick Deering 4¼″x5″ Gasoline Tractor Unit-trailer included. Located near Buffalo. Favorable price. Box 594-SS.

LIMA MODEL 101—1¼ yard Shovel, Waukesha type WL Gasoline Engine. Very favorable price. Located Kansas City, Missouri. Box 598-SS.

MARION 36 STEAM SHOVEL, full revolving, mounted on Cats., 32 foot boom, 20 foot dipper stick, 1 yard dipper, rebuilt and in excellent condition. Located in Central Michigan.

MARION 31 STEAM SHOVEL, mounted on Cats., 1 yard dipper, extra 40 foot boom and drum. Overhauled and in good condition. Located Northeastern Indiana.

BYERS STEAM CLAMSHELL ON CATS., 35 foot boom, ¾ yd. clam bucket. Could be used as source for spare parts. Bargain price. Located in Northern Pennsylvania. Box 583-SS.

BUCYRUS-ERIE 41-B STEAM SHOVEL—21′ boom, 15′ dipper handle, 1¼ cubic yard Vanderhoef front quarry dipper, power boom hoist. Cat mounted. Good condition. Located near Boston. Price very reasonable. Box 604-SS.

BUCYRUS-ERIE GA-2 Gas-Air—Extra high lift 24′ boom—18′4″ dipper handle, 1 cu. yd. dipper. Single shaft cat mounting—air starter. Good condition. Located near Hartford, Conn. Box 528-SS.

THEW MODEL 00 ⅝ CUBIC YARD SHOVEL—Waukesha 4 cylinder Engine. Center drive cat. Wood armored Cab. Recently overhauled. Located eastern Pennsylvania. Must be seen to appreciate. Price reasonable. Box 603-SS.

BUCYRUS-ERIE 37-B CHAIN CROWD SHOVEL. Wisconsin D-3 6 cylinder 5½″ x 6½″ Gasoline Engine. Electric Starter. Good condition. Located vicinity New York. Box 602-SS.

OSGOOD MODEL 18 Steam—¾ yard shovel—Cat mounted. Just completely overhauled. Excellent condition. Located near Indianapolis, Ind. Box 522-SS.

MARION 1 YARD STEAM SHOVEL Box 575-SS.

LIMA 101 GASOLINE 1¼ YARD SHOVEL. Located eastern Pennsylvania. Good operating condition. Price reasonable. Box 576-SS.

MARION MODEL 450—1¼ YARD SHOVEL. AC-DC power. For 60 cycle, 3 phase, 440 volt current. Located eastern Pennsylvania. Price reasonable. Box 577-SS.

GENERAL COMBINATION SHOVEL-CRANE. Shovel Boom and Handle rebuilt. A-1 shape. ⅝ yard Dipper. 35′ Crane Boom. 12 New Cat Tread Links. Cat mounting and general condition machine—good. Located Georgia. Price very reasonable. Box 578-SS.

NORTHWEST MODEL 105—1 YARD GASOLINE SHOVEL. Fair running order. Located Georgia. Bargain price. Box 579-SS.

1—Type B Bucyrus-Erie Combination High Lift Shovel and 40′ Clamshell Machine.
1—Type B Bucyrus-Erie High Lift Shovel.
2—Type B-2 Bucyrus-Erie High Lift Shovels.
All located western Connecticut. Operating condition. Entire lot very low price. Box 573-SS.

2 INSLEY ⅝ YARD GASOLINE SHOVELS. Located eastern New York State. Bargain prices. Box 574-SS.

Small Draglines
Under 2 Yards

NORTHWEST MODEL NO. 7—40′ boom dragline and 1⅜ cu. yd. Omaha drag bucket. Powered with Twin City 4-cylinder 7¾″x9″ gasoline engine. Caterpillars 24″ treads x 14′ long. Located in Louisiana. Box No. 560-SD.

P. & H. MODEL 208 NO. 1452—45′-0″ Boom Dragline and 1½-cu. yd. Omaha Bucket. Engine 4-cyl. 7¾″ x 9″ Twin City Gasoline. Located in Nebraska. Bargain price. Box 571-SD.

P & H MODEL 700 DRAGLINE—equipped with a 50 foot boom, light 1½-cubic-yard drag bucket, electric light plant, and powered with 4-cylinder Atlas Diesel engine. Box 189-SD.

P & H DRAGLINE MODEL 700—equipped with a 50-foot boom, light 1½-cubic-yard drag bucket, electric light plant, and powered with a Waukesha gasoline engine. Box 190-SD.

NORTHWEST—MODEL No. 4—50′ boom dragline including drop ball for rock breaking. Cat mounted. 4 cylinder 6 x 7 Wisconsin gasoline engine. Excellent operating condition. Located vicinity New York. Box 470-SD.

MONIGHAN BRAND NEW—40′ Boom Dragline. Cat mounted, Waukesha four-cylinder 6½″x7″ Gasoline Engine, 900 R.P.M., 93 H.P. Electric Starter, Steel Cab. Exceptional Value. Box 453-SD.

NORTHWEST MODEL 102—36′ BOOM COMBINATION CLAMSHELL-DRAGLINE including ½ yard drag and clamshell buckets. Good operating condition. Located near Chicago. Very reasonable price. Box 581-SD.

P&H MODEL 775—70′ BOOM DRAGLINE including 1½ and 2 yard Omaha Buckets. Extra long Crawler. Excellent mechanical condition. No repairs needed. Located near Memphis. Box No. 489-SD.

2 NORTHWEST MODEL 104 Gasoline 40′ Boom Draglines. Box 515-SD.

BUCYRUS-ERIE 30-B Diesel 40′ Boom Dragline. Box 437-SD.

Small Clamshells and Cranes
Under 2 Yards

NORTHWEST — MODEL 105 — 45′ BOOM CRANE. Cat mounted. 1 yd. capacity. 6¼x8 Twin City gasoline engine. Good operating condition. Located vicinity New York. Box 469-SCC.

BUCYRUS-ERIE 1030 GASOLINE 40′ BOOM CLAMSHELL MACHINE. Cat mounted. No Bucket. Recently overhauled. Guaranteed. Located Kansas City. Box 543-SCC.

NORTHWEST MODEL 105 Gasoline—40′ boom clamshell. Good operating condition. Located Iowa. Box 516-SCC.

BAY CITY "PUP" CLAMSHELL MACHINE. Good operating condition. Box 514-SCC.

THEW-UNIVERSAL 35 CRANE on center drive cats, 36′ Boom, fairleads, ½ yd. dragline bucket, 3000 lb. hammer, leads and cap. Excellent condition, sale or rent. Located Western Ohio. Box 457-SCC.

BYERS BEARCAT 25′ BOOM CLAMSHELL. (¾ swing) and ½ cu. yd. Clamshell Bucket, including Trench digging attachment carrying ½ cu. yd. dipper. 24″ wide over cutters—will dig maximum 15′. Good operating condition. Very attractively priced. Located vicinity of Wilkes Barre, Pennsylvania. Box 494-SCC.

CRANE—THEW—UNIVERSAL—MODEL 35—25′ boom clamshell—crane including ½ cu. yd. Williams clamshell bucket—center drive cat. Electric starter, 4 cylinder Waukesha 4½″x 6¼″ gasoline engine. Also, complete ½ yd. shovel equipment, drag shovel equipment and skimmer scoop equipment together with homemade trailer. Box 468-SCC.

Large Shovels and Draglines
2 Yards and Over

IN SOUTH CAROLINA near Marietta, **70-C STEAM SHOVEL.**

IN KENTUCKY near Nonnell, **225-B STEAM SHOVEL.**

Bargains as source of spare parts. Box 558-LSD.

FOR SALE
CLASS 14 STEAM DRAGLINE with 2-yard Page bucket. Location Iowa. Very good condition. Surprisingly low price f.o.b. cars.
ALSO
2-YARD MONIGHAN STEAM DRAGLINE in fair condition—cheap.
Box 419-LSD.

MODEL 6150 DIESEL DRAGLINE with electric swing in Northeastern Pennsylvania, reasonably priced, 160′ boom, 6 yard bucket, promptly available. Box 605-LSD.

70-TON STEAM SHOVEL mounted on "cats." Caterpillars in good condition. Located near Hazelton, Pa. Box 162-LSD.

50-B STEAM SHOVEL, Number 3946; equipped with 1½-cubic-yard dipper, 26-foot boom, also 1½-cubic-yard dragline bucket with 50-foot boom caterpillar mounted, equipped for burning oil, located at Texarkana, Ark. Price very reasonable. Box 112-LSD.

FOR SALE

Address all box numbers c/o Excavating Engineer at South Milwaukee, Wisconsin

Large Shovels and Draglines
2 Yards and Over
Continued

225-B SHOVEL, 6 and 7-yard dipper with caterpillars and track type equipment—in first-class condition. Located in northern Missouri. Box 452-LSD.

85-C STEAM SHOVEL, on caterpillar mounting, caterpillars in good condition, price $2,500. Located near Haselton, Pa. Box 163-LSD.

For Sale or Rent

ONE CLASS-14 STEAM DRAGLINE excavator Number 3327 60-foot boom, 2-cubic-yard bucket, caterpillar mounted, equipped for burning gas or oil. Price very reasonable. Located at Turkey Creek, La. Box 111-LSD.

TYPE 175-B ELECTRIC, No. 794 equipped with 87' shovel boom, 48' dipper handle, 3½-yd. bucket, and dragline equipment including 125' boom, and 3½-yd. bucket. This machine was recently reconditioned and is in good operating condition. Present location, Connecticut. Box 263-LSD.

CLASS-24 BUCYRUS-ERIE STEAM DRAGLINE, shop number 912; 115-foot boom, 3½-cubic-yard Page bucket. Florida location. Box 75-LSD.

50-B STEAM BUCYRUS-ERIE
COMBINATION SHOVEL AND DRAGLINE

26' Boom
17' Dipper Handle
2 yard Dipper
50' Boom Dragline Equipment

1 KW 32 Volt Moon Electric Light Plant
Boiler—Standard coal burning locomotive type 54"x9'7"

1¾ cubic yard Page Bucket

INCLUDING

2 steel under-frame flat cars on which machine now loaded. New 1929. Shop No. 10557. Moved only 200,000 yards material. Excellent condition. Deal direct with owner.

PRICE VERY ATTRACTIVE

Box No. 465 LSD.

MONIGHAN DRAGLINE MODEL T, 2-cubic-yard 60-foot boom located near Wichita, Kansas. About seven years old. Has recently been thoroughly overhauled. Box 180-LSD.

68-C BUCYRUS ELECTRICALLY OPERATED SHOVEL, equipped with 2½-yard manganese front dipper, 3 phase, 60-cycle, 440-volt motors, transformers, cable, reel and approximately 1400 feet of cable all in excellent condition. Reasonable price. Address Box 268-LSD.

70-C BUCYRUS STEAM SHOVEL on Cats. Complete. In operating condition. Shop number 1712. Also one extra three-yard Manganese dipper. Chicago territory. Box 347-LSD.

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FOR SALE OR EXCHANGE

One Bucyrus 2½ yd. dipper, track shovel. Would consider late model tractor. Box 572-LSD.

For Sale or Rent

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Locomotives

1 18-TON VULCAN LOCOMOTIVE No. 387, 10x16 cyl., 36" gauge.

1 40-TON VULCAN LOCOMOTIVE No. 3295, 14.22 cylinders, link valve motion, standard gauge.

1 40-TON DAVENPORT LOCOMOTIVE No. 2189, new May 1931, 14x20 cylinders, link valve motion, standard gauge.

Box 100-L.

LOCOMOTIVES

6 BALDWIN, 17x24, straight drive standard gauge 45 ton locomotives. 54 inch boilers. Shop numbers from 32,750 to 34,611. Each one has passed State Boiler Inspection yearly. Boilers will stand cold water test of 240 lbs. At present in actual service in Minnesota mine. Box 152-ME.

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WANTED
20 Good used, Sanford-Day, Drop-Bottom Mine Cars, 42" gage, 3 or 4 ton capacity. 539-ME.

3 15-TON SANFORD-DAY DROP BOTTOM CARS, 36" gauge, link couplers.
6 40-TON SANFORD-DAY DROP BOTTOM CARS, without air brakes, standard railroad couplers, standard gauge.
2 12-YARD WESTERN, 2 WAY DUMP CARS, standard gauge.
3 6-YARD WESTERN, 2 WAY DUMP CARS, 36" gauge.

Box 100-DC.

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4 LA PLANT CHOATE 6-yard, all-steel, dump wagons. Equipped with wide iron wheels. Price $175.00 each. Chicago territory. Box 349-ME.

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Offered for sale by Southern contractor. Priced to sell.

7—Railroad Type Steam Shovels 2½ to 5 yd.
3—Full Revolving Shovels, ¾ yd.
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32—12-yd. Western Heavy Duty Dump Cars.
3—Camp Cars.
1—Flat Car.
2—1-bag Gasoline Concrete Mixers. Pumps, Boilers, Jacks and Other Tools.

For further particulars, Address Box 138-ME.

SHOVEL FRONT END for Bucyrus-Erie B-2 steam machine consisting of 19'9" new style heavy boom, 16' new style heavy dipper handle, and ¾ yard C.F.I.T. dipper. Box 584-SFE.

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Excavating Engineer
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10 Slips.
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1 Forge.
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10 Switch points.
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1 Set boiler tubes for steam shovel.
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1 36x84" vertical boiler.
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100 Timbers, 10x12x16'.
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Will consider individual sale of separate items.

Address Box 449 ME.

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So. Milwaukee, Wis.

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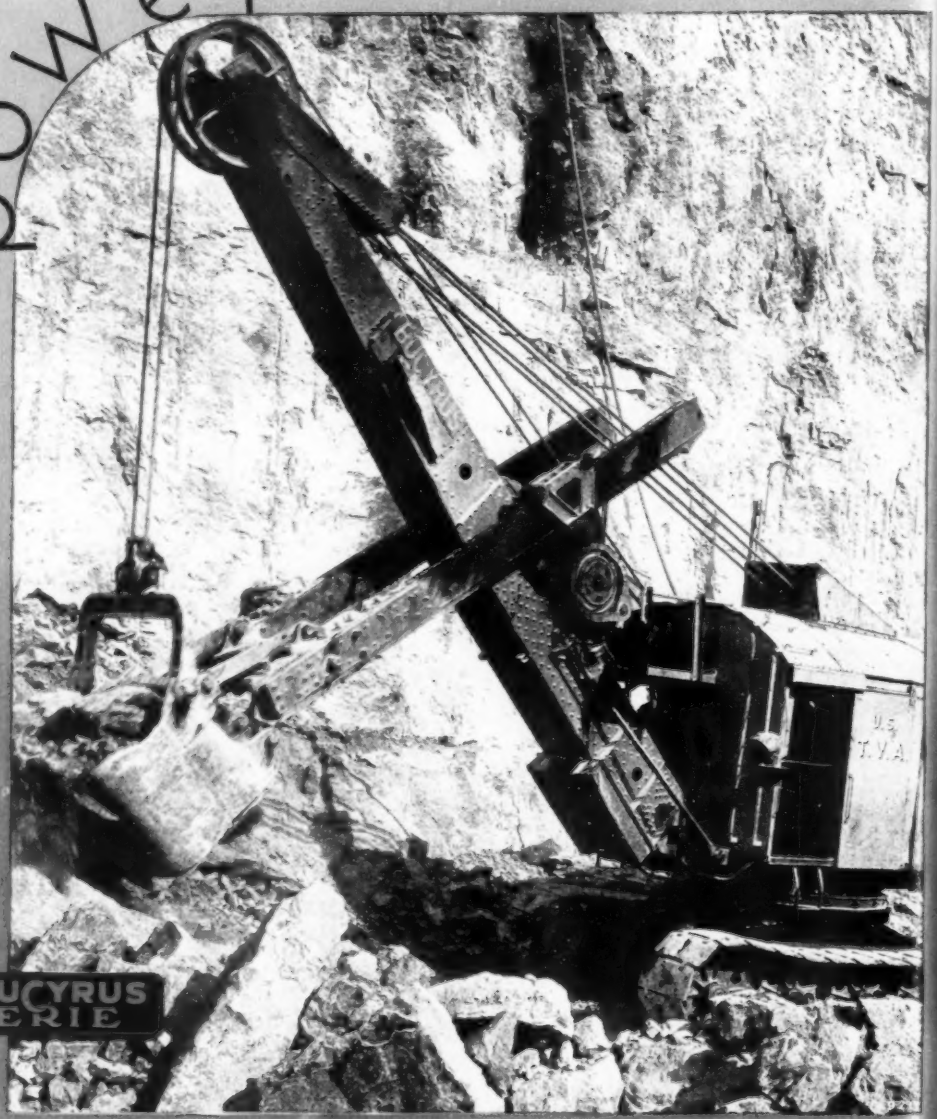

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